NORMAN A. JOHNSON
Editor

CHARLES A. WHITEHEAD
Managing Editor

MYRON D. REESER
Business Manager

HERBERT A. STAUDERMAN
Advertising Manager

WILLIAM J. O'CONNOR
Production Manager

BERYL A. LAKNER
Circulation Manager

OFFICIAL PUBLICATION OF THE PROCEEDINGS, AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

American Dyestuff Reporter was founded in 1917 and the Textile Colorist and Converter (formerly Textile Colorist) was incorporated with it in January, 1949. Published every other Monday, by the **HOWES PUBLISHING COMPANY, INC.**, 44 East 23rd Street, New York 10, N. Y. **C. R. Howes**, President; **Ernest J. Finan**, Executive Vice-President; **Norman A. Johnson**, Vice-President & Treasurer; **Myron D. Reeser**, Vice-President; **Clara Patrick**, Secretary.

Telephone SPring 7-9364

AMERICAN
DYESTUFF REPORTER
DEVOTED TO TEXTILE WET-PROCESSING

contents

VOLUME 49 March 21, 1960 NUMBER 6

special articles

Formic Acid Colloid of Methylmelamine Resin Treatment of Cotton: Preliminary Cost Study 31 (180)
O J McMillan Jr, K M Decossas, W N Berard, W A Reeves, E F Pollard, and E L Patton
Super-Power Dielectric Dryer 68 (209)

aatcc proceedings

New Horizons for Pigment Printing 35 (184)
Norman S Cassel
Membership Applications 40 (189)
Orlon Cantrece—DuPont's Newest Sweater Fiber 41 (190)
Herbert T Pratt
Finishing Blends of Orlon and Cotton in Underwear 43 (192)
Herbert T Pratt
Employment Register 44 (193)
Council Highlights (218th Meeting) 45 (194)
Call for Nominations for the Harold C Chapin Award 46 (195)
Elected to Membership 47 (196)
AATCC Calendar 47 (196)
Future Papers 48 (197)
Activities of the Local Sections 48 (197)
Organization of the AATCC 50 (199)

departments

Abstracts 33 (182)
Inter Alia—Inter Nos 53 (200)
P J Wood
News of the Trade 57 (202)
Names in the News 60 (204)
New Products, Developments, Processes 66 (207)
Technical Literature 73 (212)

Copyright, 1960, Howes Publishing Co, Inc

Contents of previous issues can be found by consulting the Service and Technology Index and the Engineering Index, at your Library

Now!

textile processors spell it

. . . best buy for your detergent dollar!

OTHER TEXTILE NACCONOLS

NACCONOL NR Flake
NACCONOL DB Dense Beads
NACCONOL DBX Super Dense Beads

All Minimum 40% Active Organic Content!

NACCONOL® SL Alkyl Aryl Sulfonate is the largest selling liquid detergent in the textile industry.

First, NACCONOL SL delivers more cleaning power per dollar on an active ingredient basis than most dry products.

Second, it cuts production time and costs . . . minimizes waste. Liquid NACCONOL SL is clean, easy to handle, requires no dissolving.

Convince yourself of NACCONOL SL's economy with a mill trial. Call or write your nearest National Aniline office for a test sample.

NATIONAL ANILINE DIVISION
40 RECTOR STREET, NEW YORK 6, N. Y.
Atlanta Boston Charlotte Chicago Greensboro Los Angeles
Philadelphia Portland, Ore. Providence San Francisco
In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 18
Distributors throughout the world. For information:
ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.

Allied Chemical

AMERICAN

DYESTUFF REPORTER

Volume 49 March 21, 1960 No. 6

FORMIC ACID COLLOID OF METHYLOLMELAMINE RESIN TREATMENT OF COTTON: PRELIMINARY COST STUDY

O J McMILLAN JR, K M DECOSSAS, W N BERARD, W A REEVES, E F POLLARD, and E L PATTON

*Southern Regional Research Laboratory**

New Orleans, Louisiana

INTRODUCTION

A new technique has been developed at the Southern Regional Research Laboratory for the application of methylolmelamine resins to cotton. Formic acid colloid of trimethylolmelamine is applied to fabric by essentially the same method as that conventionally used for resin finishing, that is, padding, drying, and curing (Figure 1). This process differs from conventional applications in that formic acid is used in the treating solution to produce a colloid. It also differs from other acid colloid finishes in that the resin is deposited in the outer portion of the cell wall, which results in significantly different physical properties for finished fabric. The treated fabric exhibits remarkable resistance to rot and outdoor weathering (*1*). This finish has also been observed to have some wrinkle resistance.

Resistance to microbial attack has been reported by Cooke (*3*) for cotton fabric containing 15 to 20 percent aminoplast resin. Other investigators (*6,9*) have established the mildew protection provided by these resin types. Acid colloids have been used to finish cotton fabrics before, but the techniques used produced stiff goods which had only a slight degree of mildew and rot resistance (*3,7*). Another reported method of using aminoplasts as protective agents for cellulose against micro-organisms was contained in a patent by Ruperti (*8*), and assigned to Ciba, Ltd. This method is known as the Arigal process and, according to the patent, it involves curing in the presence of water at a temperature not exceeding 80° C. Steam is usually used for this purpose. The time required for curing is generally more than one hour. The rot resistance produced, however, is very good.

Use of aminoplast resins for weather-protective finishes is well known (*2,4,5*), and good protection has been provided by resin add-ons of about five percent.

The acid colloid process is unique, in that excellent rot-resistance is imparted to cotton fabric by conventional, rapid processing. A single application of about 12 percent resin is used with a drying and curing time of eight minutes. Weather resistance of the treated product is comparable to that of conventional aminoplast resin finishes.

This paper deals with the cost of imparting both rot- and weather-resistance to cotton fabric by this formic acid colloid technique.

COSTS

In this preliminary cost study, continuous fabric processing was assumed for a new hypothetical finishing plant using fabric rates of 120 yards per minute. Fabric was 80 × 80 print cloth 50 inches wide (3.12 linear yards per pound).

Annual production of this plant was varied as shown in Table I by operation for one, two, and three shifts for 250 days per year, and for three shifts for 350 days per year.

INVESTMENT COST

Total plant cost in this estimate (Table II) includes installed equipment, buildings, process piping, instrumentation, outside lines, auxiliary facilities, engineering and construction, and contingencies costs.

Total processing costs, shown in Table II, are made up of direct, indirect, and fixed costs, contingencies, and general expenses.

The largest single item of processing cost is chemicals cost which accounts for 53% of total processing cost at the lowest production level, and 67% of total processing cost at the highest production level. Chemicals costs were estimated at 3.55 cents

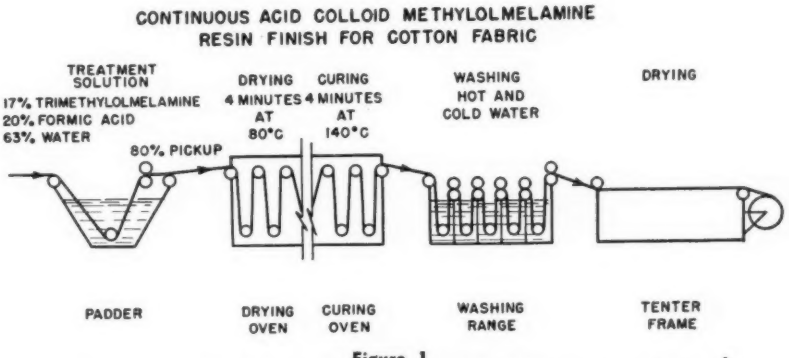


Figure 1
Continuous acid colloid methylolmelamine resin finish for cotton fabric

*One of the laboratories of the Southern Utilization Research and Development Division, Agricultural Research Service, U S Department of Agriculture.

per linear yard of fabric and 9.9 cents per pound of product.

Unit prices used for chemicals are shown below:

Chemicals	Unit Price
Formic acid	16¼ cents per pound (90% acid)
Trimethylolmelamine	60¼ cents per pound
Water	25 cents per thousand gallons

Labor costs are estimated as those applicable to a textile finishing plant, with skilled labor at $2.35 per hour and semiskilled labor at $1.62 per hour. Double time was used for weekend work and a ten percent night labor differential was used for second- and third-shift operations.

Total processing cost, as shown at the bottom of Table III, is expressed as cents per yard of 50-inch wide 80 × 80 print cloth (3.12 linear yds/pound), and as cents per pound of resin-treated fabric. The total costs in each estimate are exclusive of the cost of cotton used and are for custom processing without profit.

TABLE I
Annual production

Daily operation Number shifts of eight hours	Annual operation Days	Annual production Linear yards fabric	Annual production Pounds of treated fabric
1	250	14,400,000	5,169,000
2	250	28,800,000	10,338,000
3	250	43,200,000	15,508,000
3	350	60,480,000	21,711,000

TABLE II
Continuous acid colloid methylolmelamine resin finish for cotton fabric[1]

	Total Plant Cost
a) Installed equipment	$ 575,156
b) Process piping (13% of "a")	74,770
c) Instrumentation (2% of "a")	11,503
d) Outside lines (3% of "a")	17,255
e) Auxiliary facilities	80,000
f) Building	258,405
g) Physical plant cost	$1,017,089
h) Engineering and construction (20% of "g")	203,418
i) Contingencies (15% of "g")	152,563
j) Total plant cost	$1,373,070[2]

[1]80 x 80 cotton print cloth, 50" wide, 3.12 linear yards per pound, at rate of 120 yards per minute.

[2]This total plant cost is for a plant used for one-shift operation at an annual production of 14,400,000 yards. For operation of two or more shifts per day and annual productions up to 60,480,000 yards, additional raw material storage is necessary, and total plant cost is thereby increased to $1,403,332.

TABLE III
Continuous acid colloid methylolmelamine resin finish for cotton fabric

Annual Plant Capacity (1000's yds)	14,400	28,800	43,200	60,480
	Total Processing Costs — Cents/linear yard			
Direct expenses				
Chemicals	3.55	3.55	3.55	3.55
Labor	0.14	0.15	0.15	0.20
Supervision	0.01	0.02	0.02	0.02
Maintenance	0.33	0.17	0.11	0.08
Plant supplies	0.05	0.03	0.02	0.01
Utilities	0.22	0.22	0.22	0.22
Indirect expenses				
Payroll overhead	0.02	0.03	0.03	0.03
General plant overhead	0.12	0.08	0.07	0.07
Packaging cost	0.08	0.08	0.08	0.08
Fixed expenses				
Insurance	0.10	0.05	0.03	0.02
Property taxes	0.19	0.10	0.06	0.05
Depreciation	0.52	0.26	0.17	0.12
Contingencies	0.27	0.24	0.23	0.22
General expenses				
General admin & office overhead	0.17	0.15	0.14	0.14
Financing[1]	0.60	0.36	0.27	0.22
Sales	0.34	0.30	0.28	0.28
Total Processing Cost				
Cents/yard	6.7	5.8	5.4	5.3
Cents/pound product[2]	18.7	16.1	15.2	14.9

[1]Financing expense is estimated as 5% of the sum of total plant cost and working capital requirements.

[2]The product weight is 2.78 linear yards per pound with 12% resin add-on.

SUMMARY

This preliminary cost study for the formic acid colloid methylolmelamine resin finish of cotton indicates a low cost for imparting, in a single treatment, both rot- and weather-resistance. Estimated cost of applying a 12% resin add-on varies from 6.7 cents down to 5.3 cents per yard of fabric. This is equivalent to a range of 18.7 cents down to 14.9 cents per pound of resin-finished cotton. The economies effected by operation of a plant at higher annual production levels is readily apparent from Table III. This process is quite suitable for the continuous processing of fabric on conventional textile equipment.

ACKNOWLEDGMENT

The authors wish to acknowledge with thanks the assistance provided by G I Pittman, engineering draftsman, Engineering and Development Laboratory, Southern Utilization Research and Development Division, in the preparation of drawings for this manuscript.

We also wish to acknowledge the assistance provided by Claire L Weber, statistical clerk, Engineering and Development Laboratory, Southern Utilization Research and Development Division, in the preparation of tables for this manuscript.

REFERENCES

(1) Berard, W Norbert, Gautreaux, Gloria A, and Reeves, Wilson A, "Formic Acid Colloid of Methylolmelamine as a Weather- and Rot-Resistant Finish for Cotton," *Textile Research J 29*, 126-133(1959).
(2) Brysson, R J, Berard, W N, and Bailey, J V, *ibid 27*, 209-213 (1957).
(3) Cooke, T F, *ibid 24*, 197-209 (1954).
(4) Dean, J D, Fynn, P J, *et al*, *Am Dyestuff Reptr 36*, 705-710 (1947).
(5) Fynn, P J, Daly, C N, Fleming, C M, and Dean, J D, *Textile Research J 21*, 116-123 (1951).
(6) Nute, A D, *Am Dyestuff Reptr 34*, 230-231 (1945).
(7) Nute, A D, et al, *ibid 38*, P842-852 (1949)
(8) Ruperti, A (to Ciba, Ltd), U S Pat 2,763,574 (Sept 18, 1956).
(9) White, W L, and Siu, R G H, *Ind Eng Chem 39*, 1628-1630 (1947).

Tear sheets of articles which have appeared in AMERICAN DYESTUFF REPORTER since July, 1956 are available in limited quantities. (Consult year-end indexes for list of titles). These may be obtained by sending a stamped, self-addressed envelope along with a request for the specific articles. Write TEAR SHEETS, American Dyestuff Reporter, 44 East 23rd St, New York 10, NY.

Abstracts

Epoxy Resins in Crease-resist Finishing

Marsh, J T, Textile Recorder 77, 69-70, 72, Nov, 1959

During the past few years, considerable effort has been expended in a search for resins which will produce a crease-resistant finish free from any tendency to absorb chlorine from the hypochlorite solutions which are all too commonly used in household laundering, particularly in the U S.

The presence of nitrogen in the molecule of the amino-aldehyde resins which are commonly employed imparts a susceptibility to the absorption of chlorine. With some resins this causes a yellow discoloration which becomes worse if the fabric is ironed. Also, the resin may decompose on heating, liberating hydrochloric acid which tenders the fiber.

Among the new resins for textile uses are the epoxy resins, which contain no nitrogen in the molecule, nor do they contain methylene groups from formaldehyde residues. The author explains the chemistry of the epoxy resins and in particular the di-epoxides, which have the property of cross-linking with the cellulose molecule under the influence of a powerful catalyst (eg, zinc fluoborate). Here the reaction is between the epoxy group of the resin and the hydroxyl group of the cellulose.

These resins are very reactive in aqueous solution, when the epoxy groups are transformed into glycol groups; hence the impregnating solution or emulsion should be made immediately prior to application.

For creaseproofing effects the resin should contain two epoxy rings, linked through an intermediate group, which can be almost any nitrogen-free chemical group (eg, ethylene glycol).

In common with all creaseproofing resins, the epoxy compounds produce a loss in the tensile strength of the cellulose fiber.

There is considerable interest in combinations of the epoxy resins with the amino-aldehyde resins, for in suitable proportions it is possible to obtain high durability, excellent crease-resistance, and freedom from chlorine retention, due to the direct chemical combination between the epoxide group and any free imino-groups in the nitrogenous resin likely to retain chlorine.

Organic phosphorus compounds containing three epoxy groups, which add flameproofing to their other properties, are also described. The author compares these compounds with the "APO" resin, which also produces creaseproofing and fire-retardance.

•

Du Pont Dyes for Darvan Nytril Fibers

Anon, Dyes & Chem Tech Bull (Du Pont) 15, 138-50, Sept, 1959

A modified form of Darvan, called "Type X-7", is said to have much better dyeability than the older type.

For dyeing regular Darvan, the newer cationic dyes are recommended for bright, lightfast pastel to heavy shades. Addition of a carrier, or dyeing under pressure, is necessary for the heavy shades, and an anionic agent is required to promote exhaustion of the dyebath.

Disperse dyes may be used for pastel to light shades. A carrier is necessary for the heavier shades, which should be well scoured after dyeing. For navy and black shades, disperse-developed dyes are recommended.

The new Darvan X-7 nytril fiber is said to have affinity for more classes of dyes than the older type. It does not require pressure dyeing or carriers, and the dyeing time is reduced.

For the new type, selected acid dyes may be used for light to heavy shades, with the addition of up to 5% sulfuric acid. Selected chrome dyes are recommended for the heavier shades, and have the best all-round fastness in this shade range. Neutral-dyeing premetallized dyes have good fastness in the light-to-medium range. Disperse dyes may be used, but lack good wetfastness.

Full particulars are given for applying these various classes of dyes, and lists of selected dyestuffs from each class are included.

Darvan, because of its unique combination of properties (eg, softness, elastic recovery, high softening point, etc), is believed by its manufacturer to be an ideal fiber for apparel use. It first appeared on the market in deep-pile simulated-fur coats. The fiber has been used in hand knitting yarns. Soon to appear on the market will be suitings, sweaters, shirts, blouses, dresses and coats of 100% Darvan and blends containing Darvan and wool, cotton, silk or linen.

Xenon-arc Fading Lamps

McLaren, K, J Soc Dyers Col 75, 594-6, Dec, 1959

The lightfastness of a colored material is determined in England by exposing it to light together with eight blue wool British standards. The official method (BS 1006: 1955) specifies daylight as the light source, but because this is inevitably slow, particularly in winter, fading lamps are widely used.

Investigations carried out in recent years suggest that a fading lamp will give the same result as a daylight exposure if the nature of the light (ie, its spectral composition) closely resembles daylight through window glass, and the temperature and the moisture content of the specimen during exposure are equal to the average values occurring in a daylight exposure. Average values for the United Kingdom have been published and are not difficult to obtain in a well-designed lamp, but until recently it was not possible to meet the first requirement, namely that the light source should resemble daylight.

In 1947 a new light source, called the "gas arc", was introduced; this consisted of a xenon gas-discharge lamp in quartz, operated at relatively high current density. Both in spectral composition and in attainable illumination level the light emitted was found to be much closer to daylight than with any artificial light source (eg, carbon arc or mercury-vapor lamp) previously available. In 1954 the first fading lamp based on a xenon arc was marketed by Quarzlampen GmbH, Hanau, Germany. Two such lamps are marketed today —the Xenotest PL 393, which employs a wet-wick system for humidification, and the Xenotest-W (PL 394), which has in addition four jets for more efficient humidification, and two for spraying the specimens if fastness to weathering is required.

Both lamps have been thoroughly studied to determine how closely they approach average daylight. They are described in great detail.

The author, in his summary, stresses the three criteria which must be fulfilled if the maximum correlation between a fading-lamp exposure and an average UK daylight exposure is to be obtained: these concern spectral characteristics, temperature, and effective humidity.

The xenon arc can be easily filtered

(*concluded on page 64*)

NOTICE TO AUTHORS OF PAPERS

MANUSCRIPTS for the *Proceedings* of the American Association of Textile Chemists and Colorists shall conform to the requirements and standards given in this *Notice*. Before publication, manuscripts for the *Proceedings* shall be approved by the Editor, not only for editorial correctness according to the standards of this *Notice*, but also for content of technical matter. In his work, the Editor may enlist the aid of anonymous reviewers who are selected for expert knowledge in particular fields.

It is presumed that authors in studying the comments of reviewers and of the Editor will remember that all recommendations are made in a kindly, helpful, sympathetic manner to improve the paper in both literary and technical excellence. Although authors should cheerfully consider suggestions, they are expected to defend their position if justified, especially when strictly technical matters are involved with which the authors have an intimate knowledge.

AATCC strives to maintain a high scientific and professional standard for papers. Authors must make every effort to avoid the use of trade names, commercial products or process names wherever such use may be construed as advertising. Wherever possible, scientific nomenclature must be employed, eg, *Colour Index* designations for dyestuffs and pigments in place of the trade names. It is recognized that in some instances trade names are necessary to avoid lengthy description. Certain trade names have been so widely used as to become generic and these normally are permissable. Further, some technical papers may involve the presentation of a new product or process wherein trade name reference is obligatory.

Giving due consideration to such valid exceptions, it is incumbent upon the author to maintain the proper scientific attitude, avoiding any expressions or devices aimed at promoting a particular product or process.

Questionable papers are to be referred to the chairman of the Publications Committee, who will submit them to an editorial board which would be appointed as needed. The Board would report to the Publications Committee, which would have the final voice in accepting or rejecting a paper.

MANUSCRIPTS — Manuscripts shall be typewritten double-spaced with approximately one-inch margins on 8.5x11-inch white paper. In addition to the *original*, at least one carbon copy is required. Pages are to be numbered consecutively with Arabic numerals, and each page after the first shall carry the authorship at the very top. Tables and figures shall also be numbered consecutively, the tables with headings containing Roman numerals as TABLE I, TABLE II, etc, and the figures with Arabic numerals as Figure 1, Figure 2, etc, appearing *below* the figures. The names of the authors and their laboratories or business connections should appear below the title of the paper.

LITERARY STYLE AND FORM OF PRESENTATION—In the writing of papers, authors are requested to observe a trenchant, simple style of writing directed to textile chemists and colorists with at least an elementary knowledge of chemistry, physics, mathematics, engineering, textile processes and textile machinery.

In the organization of the material, there should be one or more introductory paragraphs setting forth the occasion, significance and main objectives of the paper and of the method of attack. This should be followed by the body of the presentation, either with discussions interspersed throughout this portion or with a collected section marked "DISCUSSION" after the main body of the paper. Finally, there may be a brief section at the end entitled "SUMMARY" or "CONCLUSIONS."

Center and side headings make for easier reading. Center headings should be employed sparingly and generally will include only very important section headings, such as "INTRODUCTION," "EXPERIMENTAL," "DISCUSSION," "CONCLUSIONS," "SUMMARY," and "REFERENCES." Side headings (see sixth paragraph of this *Notice* for an example) shall be indented and run into the text to which they apply, and shall be separated from the paragraph by a dash. The publisher will print center headings in bold-face capitals and side headings in capitals.

LITERATURE REFERENCES AND FOOTNOTES—References to the literature and all footnotes (except those in tables) shall be numbered consecutively with underlined Arabic numerals in parentheses at the proper place in the text. Where a reference or footnote is to be used again, the original number is simply repeated; this obviates the necessity of repeating the footnote or reference at the bottom of the page. References to the literature shall conform to the universal usages followed by *Chemical Abstracts*, which include underlining of journal names to indicate italicization in printing. The abbreviated codes for many journal names appear on page 183 of the 1959 *Technical Manual*.

The spelling and rules of punctuation followed in manuscripts shall be those found in the "Merriam-Webster New International Dictionary"; abbreviations and chemical formulas shall conform to *Chemical Abstracts*.

FIGURE AND GRAPHS—Figures and graphs should be black line drawings on white drawing paper. Photographic prints are acceptable, preferably glossy prints on double-weight paper. Duplicates should be available for dispatch to reviewers. In graphs the frame and actual curves should be inked more heavily than the coordinate lines, and these latter should not be too close together. Various styles of broken lines are sometimes desirable to distinguish curves. Experimental points should be given with small plane figures, such as circles, squares, diamonds or triangles. Numbers and legends on co-ordinate axes are to be lettered in the graph by the author. Numbers and titles of figures should be placed below the diagram or on the edge of the back. Each piece of illustration copy should bear on the margin or on the edge of the back the name of the author and the title of the paper.

SYNOPSIS—A separately written synopsis of not over 200 words containing the gist of the subject matter must accompany every manuscript.

GALLEY PROOFS—Galley proofs will be sent to the author by the publisher for correction before publication.

AUTHOR'S COPIES—Fifty copies of papers published in the *Proceedings* will be furnished without charge by the publisher if requested when galley proofs are returned. These copies are printed on one side of the sheet only and then stapled together. A schedule of prices of reprints in the usual form accompanies the galley proofs.

OWNERSHIP OF COPYRIGHTS AND PATENTS—All papers presented at general meetings of the Association or at meetings of any of its local sections and all communications shall become the property of the Association. Such papers are not to be published elsewhere until they have appeared in the *Proceedings* of the Association. Papers published in the *Proceedings* are copyrighted by the Association. Any patentable disclosures shall of course remain the property of the author or authors.

TRADEMARKS—As the AATCC wishes to co-operate in the protection of trademarks, it is requested that, in the body of the article, trademarks be written with an initial capital letter.

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1960, American Association of Textile Chemists and Colorists

March 21, 1960 No. 6

Metropolitan, Piedmont, and Rhode Island Sections———

NEW HORIZONS FOR PIGMENT PRINTING*

NORMAN S CASSEL
Interchemical Corporation

INTRODUCTION

BOLD thinking in this, the Space Age, is pushing back frontiers in all technology and revealing new horizons. To the average person the Space Age suggests rocket probes into outer space, but to those of us who have scientific work to do, the probings into the vast regions of inner space have revealed knowledge which is of greater practical significance in solving our everyday problems. And specifically we are finding that answers to the problems of pigment printing are coming from a better understanding of basic molecular relationships of the materials with which we work.

The purpose of this talk is to bring into focus some of these basic aspects and to indicate how they are opening up new horizons for pigment printing.

Back in 1937, when Interchemical initiated a research program in the printing of textiles with pigments, it was motivated by its success in the printing of paper. High-speed publication printing made possible such current weekly pictorial publications as *Life* magazine. Here paper was printed in multicolors at great speeds and dried with radiant heat. The possibility of a similar operation on textiles was discussed with leaders of the textile-printing industry, who agreed that if such printing satisfied the requirements of good hand, color range and fastness, the improved printing, elimination of wet processing and the increased speed would be a great step forward.

The intervening years have written the history of that development. Today pigment printing of textiles is an accepted process, and one whose growth potential is limited only by the state of its technology. As our scientific knowledge increases, commercial possibilities expand.

Early in the development of pigment printing it became clear that the printing of textiles with pigments had a number of new requirements beyond those of paper printing. The first of these was *hand*. It was learned that a fabric has softness and drape because the multiple fibers of which it is made are free to move with respect to each other and that, when these fibers were cemented together by an adhesive, which of course a printing ink is, that freedom to move is restricted and the result is a paper or board, rather than a fabric.

It was also learned that a fabric is thicker, rougher and more absorbent than paper, hence needs a larger volume of color to give good coverage. Since inks obtain their viscosity from relatively high solids, this larger required volume introduces relatively high solids in the printed areas. The combined result is marked stiffness.

As you know, the solution to this problem came through the use of emulsions. The emulsion enabled us to print with low solids and, because of the high dispersed phase, produced discrete bonding of the color to the fiber, hence minimizing the cementing action. The emulsions, however, introduced some problems, so it is important that we have an accurate understanding of the principles underlying them.

In order to understand what makes an emulsion "tick", we have to go a little bit basic. We must see what we learned from inner space. Our journeys into inner space showed us that matter is not that solid stuff we once thought it was, but that it is a complex organization of energy. Molecules are made up of atoms, atoms are made of electrons, neutrons, protons and some 27 other kinds of submicroscopic particles. For our purpose, however, we can start with molecules. Molecules are bound to each other by what are called intermolecular forces. When these forces are very strong we have a solid, when less strong—a liquid, when very weak—a gas. So we say that a given composition of matter is made up of millions of molecules held together by these inter-molecular forces. Although there are a number of different kinds of forces, the ones we are mainly concerned with are called the forces of hydrogen bonding—and most of you will recognize them as "polar groups". These groups have a strong reaction for each other.

Now if we take, for example, water —which is involved in emulsions— and look at it, we see that the molecules are so strongly bonded that although it is the union of two gases, hydrogen and oxygen, the attractive forces are so strong that it is a liquid at room temperature and on a cold day it is a solid. Within the drop which you see in Figure 1, the molecules of water are bound together by these forces. At the surface, one can see, these forces have no forces from neighboring molecules to balance them. So we say, because of these unsatisfied forces on the surface, that the surface has "free surface energy". Water has very high free surface energy—high surface tension. All surfaces have free surface energy in different degrees depending upon the chemical nature of the surface. It is important to remember this because many conditions of the emulsion, the stability of the print-cuts, adhesion to the fibers, tarnishing and many other well-known aspects of pigment printing are related to it.

Next we will look at an oil globule (Figure 2). Here, because of its molecular composition, we have a composition of matter which has much

*Presented before the Metropolitan Section on October 16, 1959 at Rochelle Park, NJ; before the Piedmont Section on January 23, 1960 at Greenville, SC; and before the Rhode Island Section on January 29, 1960 at Cranston, RI

Figure 1
Water

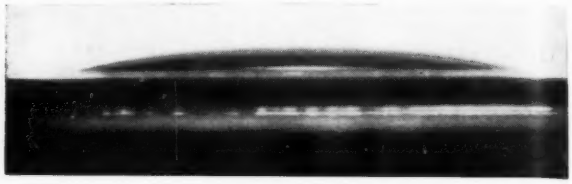


Figure 2
Oil

lower free surface energy. It has no polar groups.

A term with which all of you are familiar is that of "wetting". We all use "wetting agents". The scientific explanation of "wetting" is that when two surfaces touch each other and the total free surface energy is reduced, then those surfaces are said to have "wet" each other. Actually there is, in a sense, a reaction between the surfaces and heat is given off; this is known as "heat of wetting".

So you can see that, if two surfaces are to wet each other, they must have surface energy that can react.

So now we put our water globule and our oil globule together—and nothing happens. Neither wets the other. Why? Because the low energy surface of the oil has nothing that the strong polar forces on the water can react with—so we have no wetting. It is like putting a magnet into brass filings—it comes up clean—whereas in iron filings it would come up well covered.

When we make an emulsion, in a sense we are trying to make two immiscible liquids miscible. So we must do something to bring the free surface energy of these two surfaces closer to each other. Depending upon whether we want an oil-in-water or a water-in-oil emulsion, we make an adjustment to the free energy of one or the other.

If we want an oil-in-water emulsion, we add an agent to the water which reduces its free surface energy. These agents are molecules which have two radicals, one polar, the other non-polar. When dissolved in water, the polar groups in a sense react with the free energy groups on the surface and leave the low-energy, non-polar groups at the surface. This, to all practical purposes, reduces the free surface energy—or, in common usage, lowers the surface tension of the water.

Now when the oil and the water plus agent are agitated, the oil is broken up into tiny globules and the water, with its surface coated—shall we say—with the agent, surrounds each oil globule. There develops also, due to the ionization of the surface-active agent, what we call an electrical double layer at the surface of each droplet, which tends to keep the droplets apart. As the amount of oil increases, the system becomes crowded, the accumulated forces increase and resist the free movement of the oil particles and so we say the emulsion becomes thick. The practical effect of this thickening is that it attains "printing consistency".

If, however, we want a water-in-oil emulsion, then we adjust the free surface energy of our oil with respect to water. We do this by dissolving into it a polymer which has a polar group. Ethyl cellulose or an alkyd resin will supply these groups. Since we want our water to remain in little globules, we maintain its surface tension; in fact we add a small amount of salt to increase its polarity. The polar groups of the alkyd which we have added to our oil, which in our case is a solvent, enable the oil to "wet" the water so that the free energy of its interface is minimized. When we apply work by means of a stirrer, the water globules, wet with the solvent-resin, become dispersed in the solvent-resin.

In both kinds of emulsion, a thickening slightly of the continuous phase tends to stabilize the system.

Today both types of emulsions are in wide use and each has its advantages and disadvantages.

From the foregoing description it can readily be seen why an oil-in-water is sensitive to electrolytes, while a water-in-oil is unaffected. One of the interesting aspects of the water-in-oil emulsion is the ability to carry dyestuffs, caustic, hydro, etc, in the water phase.

The point to bear in mind is that all surfaces have free surface energy, and that in order to wet—the free surface energy of two surfaces must be reduced. We will need this fact later.

One can think of the emulsion—water-in-oil or oil-in-water—as the printing medium. The pigment and binder, as the color concentrate, are dispersed into this medium. The logical conclusion would be that the pigment will be in the continuous phase, but this is not necessarily the case. In practice the pigment is usually in the dispersed phase or possibly at the interface. In each case, however, the continuous phase of the color concentrate must be the same as that of the emulsions, in order that it may be dispersed easily. Herein lies much technology. How readily the concentrate "cuts in" has a profound effect on color value.

As used today, both types of emulsions have become complicated. Latices, water-soluble binders, hydro, lubricants, to mention a few, are added. Each has an effect upon wetting, stability, color value and fastness.

Color value was recognized early as an important requirement. Inks formulated to be printed on paper by gravure, when printed on fabrics, gave dull, dead-looking prints. It was found that the ink penetrated into the fibers and its ability to reflect light was greatly impaired. Fortunately the emulsions possess what is called "yield value" and hence control this excessive penetration and in general give good color value. There is, however, considerable difference in the color yield of various printing pastes, so that it is well to understand the principles involved. Dispersion and flocculation of the pigment also have a large effect on color yield.

The color which we print on a fabric should really be thought of as a mechanism—a mechanism for doing something to light. When white light falls upon a surface, that light is either reflected or absorbed. If all is reflected, we have a white. If all is absorbed, we have a black. In between, where some is absorbed and some reflected, we have color. The mechanism, which we have learned from our explorations into inner space, is that certain molecules selectively absorb certain wavelengths, converting them to heat, and reflect the balance. If red and green are absorbed, the balance reflected is blue; if green and blue are absorbed, we have a red; if blue is absorbed, we have a mixture of red and green which we see as yellow. Since, then, the function of our print is to perform this selective reflecting-absorbing job

efficiently, we must see that we use the proper pigments—and place them so they do their job effectively.

As stated, the emulsions provide the proper rheology for maintaining the print in proper relation to the fiber. Selection of type of clear, dispersed phase content, stability of the emulsions, set of the rollers, crush, etc, are all variables over which the colorist and the printer have great latitude.

One of the early developments that promoted emulsion stability and improved color value was what was known as the three-phase emulsion. When the water-in-oil emulsifying resin was soluble in the concentrate but gelled out as the cut clear was made, it produced a third phase pigment aggregate which greatly improved color yield over the simple emulsion. This principle is used universally today in water-in-oil systems.

Since the pigment is the heart of the reflection-absorption mechanism, it is vital that the pigment be well dispersed and stay so. In order to ensure good dispersion and to prevent flocculation, the pigment must be "wet" by the binder. That brings us back to free surface energy.

Pigments have surface. Depending upon their chemical composition, their free surface energy varies. Organic pigments such as phthalocyanine blue have very low free surface energy. Inorganics such as titanium oxide or iron oxide have high free surface energy. Unless the surface characteristics of a pigment are considered in relation to the type of resin used, the pigment will not be properly wet, and flocculation, particularly in long cuts, may result.

Pigment manufacturers have learned how to modify pigments to a certain extent and we now have pigments conditioned for aqueous systems as well as organic systems. In many cases, however, it has been necessary to specifically modify a pigment for a given vehicle.

One such case is that of ultramarine blue. This shade, so popular with stylists and always in every artist's palette, frequently appears in designs. Colorists have found it hard to match with dyestuffs, so that when pigments appeared, this shade was insistently requested. Ultramarine blue is an inorganic which has high free surface energy. It is really a glass. When we dispersed it into the normal binders, it gave very poor fastness. Recognizing that its high free surface energy made it prefer water to the binder, we worked out a treatment which greatly reduced its free surface energy, and made it a useful pigment with close to normal fastness.

Other pigments have such low free surface energy that it is necessary to treat them to make them more hydrophilic. Carbon black is a study in itself, as is also titanium dioxide. It requires close cooperation with the pigment manufacturer to tailor-make pigments for a specific binder system.

The point to remember is that, if the print is to have good color value, the pigment must present as nearly continuous an area as possible, so that light falling upon it will reflect most efficiently the wavelength desired. This means that the pigment must be well dispersed in the print paste and that, when dried, as little as possible of the white fiber shows between the discrete areas.

The problem becomes more difficult in the long cuts. Here a small amount of color concentrate must be thoroughly dispersed in a large amount of clear. If the concentrate does not "cut in" easily, the print will contain considerable white areas. These do not appear as such to the naked eye, but the effect is dullness and lack of clarity. Because the uncolored fiber is usually slightly yellow, we have what is known in optics as additive mixing. For example, when blue and yellow dots side by side are seen en masse, the effect on the eye is not green but grey. This accounts in part for the greyness of long cuts of blue not properly "cut in".

This difficulty of getting complete coverage of the fiber is one reason why it is difficult to get a really good black with pigments. It takes very little reflectance to remove the bloom and depth of a black—which, of course, should be 100% absorption. The same is true to a lesser degree of all very dark shades.

Another aspect of color value or clarity is not generally understood, and that is what is known as "bronzing". Those of you who have walked through a pigment plant and have seen trays of press cake may have noticed that phthalocyanine blue, for example, has a red sheen. Certain reds have a green sheen. This phenomenon is called bronzing. It is particularly noticeable when the light enters the pigment from air. The pigments which bronze have an abnormally high index of refraction on the long wavelength side of the absorption band, hence reflect at that band. Certain blues reflect red; certain reds reflect green. This puts a premium on properly wetting the pigment with the binder so as to minimize this bronzing effect.

The attainment of full color value is dependent on well-dispersed and formulated color concentrates and the intelligent use of these concentrates by the color shop, particularly in the choice and preparation of the clear or extender and the thorough mixing of the concentrate into the cut-clear.

Since the pigment is the heart of the color mechanism, its fastness property is important. It must resist degradation by alkali and other chemical solvents, and by light. In the early days of pigment printing, few pigments were available which met the three classes of requirements. In the intervening years many excellent pigments have been developed by Interchemical and by others so that today choice can be made to meet the most exacting standards. For all-around fastness the molecular structure of the pigment must have a crystalline configuration with a minimum of polar groups, hence resistant to acids, alkali and solvents. Understanding of the structure to resist degradation by visible and ultraviolet light is not as clear and is currently under study in Interchemical's Central Research Laboratories.

Perhaps the greatest challenge presented to the pigment printing of textiles was and is in the area of fastness. Standards of washfastness, especially scrubfastness, drycleaning, wet and dry crocking, vary for different end uses. That pigment printing has satisfied them to a degree is attested by the millions of yards printed. Technical progress in this area has been steady and gratifying. As this progress continues, the opportunity for pigment printing will grow.

Washfastness depends upon the forces of adhesion plus chemical conversion of the resin. For years people have wondered about what makes things adhere. Current understanding tells us that adhesion results from the attraction between polar groups on the resin and polar groups on the substrate. These groups, as in wetting, represent those forces at the surface which we have referred to as free surface energy. We recognize them in the chemical structure of the fibers as well as the resins. Chemically we speak of them as hydroxyl, carboxyl, amine, amide, epoxy groups, etc. For strong adhesion, some of these groups must be present both on the fiber and in the resins.

Polymer technology enables resin

chemists to build these groups into many combinations of polymers. New techniques of polymerization such as graft, block and heterogeneous polymerization have made many new polymers available to meet different end-use requirements.

New polymers are appearing as fibers so that today we have to print not only cellulose as cotton, rayon and acetate, but polyamides, polyesters, polyacrylics in various copolymers, and terpolymers. We also have the first polyolefines appearing. Glass has been with us for some years. All of these fibers must be thought of as the counterpart to our resins in this business of adhesions. Let us take a look at a few of them.

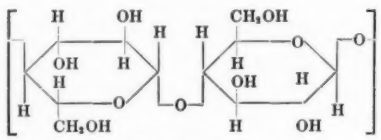


Figure 3
Cellulose

In Figure 3, we see cellulose. It could be cotton or rayon. Here the important polar groups are hydroxyls, with a few carboxyls.

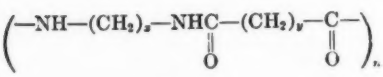


Figure 4
Nylon

In Figure 4 we see a polyamide—nylon. Here the important groups are carbonyl and amide.

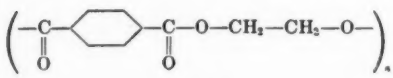


Figure 5
Dacron

In Figure 5 we see a polyester—Dacron. Here carbonyl and ester groups exist.

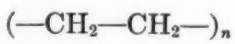


Figure 6
Polyethylene

In Figure 6 we see a polyolefine—polyethylene. Until they are flame-treated, these films have no polar groups.

In Figure 7 we see a wool. On wool and silk we have carbonyl, amide and amino acid groups.

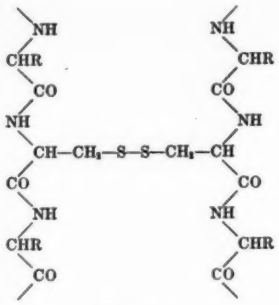


Figure 7
Wool

In Figure 8 we see a silk, with the same groups as wool.

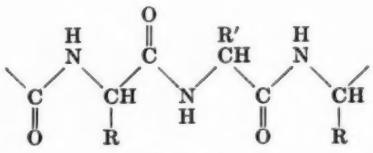


Figure 8
Silk

In Figure 9 we see a fiberglass. Here we have extremely active electro-negative oxygen, which needs to be pacified to control adhesion.

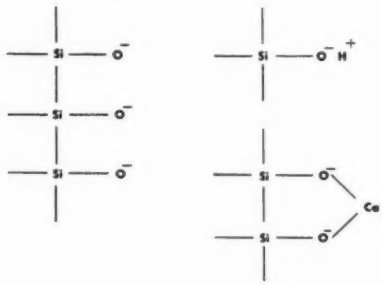


Figure 9
Groups on glass

These, then, are the polar groups which, together with appropriate groups in the binder, provide adhesion.

Through the years we have used as the primary binder of pigment printing systems a combination of alkyd and amine resins. These two resins have polar groups which give strong bonds of adhesion with most fibers.

This brings us to the next important point in adhesion, namely that of chemical conversion.

The same polar groups which give us the bonds of adhesion also have a strong attraction for another polar material—water. So unless we do something to remove the polar groups on the resin, we will not have washfastness. While polar groups still exist on the binder, it is water sensitive. Water plus soap and mechanical action will destroy the bond and remove the color.

The alkyd-amine resin combination is what we call thermosetting. It polymerizes with heat—cross-links its polar groups—which to all practical purposes removes them from reacting with water. Although this thermal polymerization requires a temperature of 300°F for several minutes without catalyst, it can be reasonably well cured with an acid catalyst at about 250°F for five minutes. After many years of successful use, the alkyd-amine resin system continues to be the main binder in current systems.

Realistic washfastness must take into account the exposure to light which occurs between washings. Certain binders are degraded by light and lose their resistance to water and soap. Consequently prints such as draperies which are exposed to considerable sunlight need colors which can stand alternate light and washing.

Although amine-alkyd resins gave satisfactory washfastness, it was early noted that fastness to rubbing or "crocking" was poor. For some ten years pigment printing was limited to light shades, or small areas, by this weakness. Then in 1947 a major breakthrough in pigment printing came in the discovery of the use of elastomers. A forerunner of this discovery was the observation that certain specialty inks made from rubber cement were excellent to crocking. Since natural rubber is not a good binder, synthetic rubbers of various types were investigated, which program resulted in the use of nitrile rubber latices. These, added to the water phase of water-in-oil emulsions, produced a remarkable improvement in crockfastness and imparted great impetus to pigment printing. Now dark shades could be printed and the crocking in most cases was of the order of that obtained in light shades formerly. It was and still is not completely satisfactory, but again many areas were opened where this amount of crocking was acceptable.

Much research effort has been devoted to this phase of pigment printing and frankly we must admit that much is not fully understood. "Dry" crocking bears little relation to washfastness, so one concludes that it is not a matter of adhesion to the fiber. Examination of crock patches shows

that the color on the patch is pigment and resin. The conclusion is that the crocking is the result of failure in cohesion rather than adhesion. Yet when one thinks of amine-resin combinations, it must be remembered that these are the tough films that are used on refrigerators and automobile finishes.

The answer probably lies in the mechanism of crocking which is guessed to be as follows.

The printed fabric to be tested and the crock patch are soft-rough surfaces. Each, microscopically considered, contacts each other with a multiplicity of small points. As the crock patch moves over the printed area, the small points abrade against the discrete areas of color. If the color areas have no elasticity, the momentary force is great enough to tear off a small amount of color. If, however, the color can stretch slightly, it extends with the point, then snaps back without tearing loose. This amount of elasticity seems to be critical, for as latices with less elasticity are used, the crock reduction is less. Natural rubber which becomes brittle with age or ozone quickly loses its crock-reducing ability. Other latices, less elastomeric, are not as effective. Much of the knowledge we have is empirical. More accurate knowledge is needed.

Then we have "wet" crocking. Here we see the effect of water-sensitive materials in the film causing a swelling and weakening of the film with a resultant pronounced crocking. This type of crock occurs in oil-in-water emulsions as well as all-water systems. The use of water-soluble polymers, soaps and emulsifying agents in the latices is the main cause of "wet" crocking.

In order, then, to overcome both dry and wet crocking we must have an elastic binder which contains no water-sensitive materials. Since the synthetic rubbers used to reduce crocking are emulsion polymers, they contain emulsifying agents, soaps or synthetics as an ingredient of their manufacture, which remain in the film. The problem, then, is to eliminate or inactivate these water-sensitive materials.

This clearer understanding of the requirements of the binder for pigment printing has brought out a new concept which we feel is opening new horizons for textile printing with pigments. This new concept is set forth briefly as follows:

1) For washfastness, the binder must have polar groups which give strong bonds of adhesion to the fibers of the fabrics being printed.
2) The binder must retain, after conversion, the necessary elastomeric properties which reduce crocking to a minimum.
3) The binder must be capable of reacting in such a way that the polar groups are tied up and thus lose their water sensitivity.
4) Auxiliary materials such as thickeners, emulsifying agents dispersing agents, etc, must have polar groups which can be tied up after their work is done.
5) A reactive agent must be present which ties up all water-sensitive groups on all ingredients so that the converted binder is highly resistant to water and other chemicals. This reactor must react at the normal temperatures of drying or steaming. Preferably this reactor should cross-link with the fiber.

The reduction of this concept to practice involved great research and development effort on our part and by our suppliers. A number of new types of materials had to be worked out.

First, in this respect, was the binder which in this concept combines strong adhesion, high elasticity and ready convertibility. The answer to this combination was found in the group of materials known as emulsion polymers. This process of producing polymers received a strong impetus from the work done on synthetic rubber during the war. In brief, it involves the polymerization of monomers in water through the use of free radicals. The final product is a dispersion of the high polymer in water and is known in many cases as a latex, particularly where elastomers are involved. The broader term is "emulsion polymer".

This process makes possible the use of combinations of monomers, and by varying conditions almost any specific properties can be built into the polymer. Thus polymers supplying the needed adhesion, resistance to ultraviolet light, solvents, chemicals can be made. It is also possible, through control of chain length and other conditions, to build in elasticity.

The perfect combination has not yet been found, but some very good ones have been developed and progress continues.

Another material that was needed to implement this new concept was a reactive thickener. Heretofore the main auxiliaries in this respect were the soluble cellulose polymers such as methyl cellulose. Such materials react sluggishly and only at high temperatures with cross-linking agents. The solution to this need was found in some of the new water-soluble polymers. A number of these are available today, but it was necessary to tailor make one for our specific needs.

A third need was for careful selection of dispersing agents with mimimum re-wetting characteristics, agents which effectively disperse and emulsify but present a minimum of polar groups liable to swell with water and thus give wet crock.

Finally, a cross-linking agent to react with all of the foregoing needed to be developed.

Many cross-linking agents for resins are available, such as epoxides, isocyanates, titanates and imines. However, much research and development was needed to perfect a compound that would work equally well with all ingredients, and yet have the necessary stability to meet conditions of the color shop and print room.

Such a reactor has been developed, which not only does the necessary job with the ingredients but shows evidence of cross-linking with the fibers as well. It is particularly effective with the new synthetics.

Not the least of the problems was to bring such a system along into practical, well-running operation. Although current systems meet the requirements in many fields, the advantages of this new system are opening up new uses. Some of those advantages are:

1) Low temperature curing
2) Improved hand
3) Improved general washfastness at low cure temperature. The improvement is especially noted in scrub or abrasive washing.
4) Improved wet crock
5) Improved appearance of blotches
6) Improved washfastness on polyamide, polyester, acrylic and glass. This advantage accrues from the understanding that adhesion is a relationship between specific surfaces.

We are confident that, within the framework of this concept, formulations will evolve which will steadily eliminate the present-day limitations of pigment printing and thus widen the areas of its use.

Throughout the history of the development of pigment printing, in

addition to the requirements of fastness, appearance and economics, there has been the requirement of runnability. Many problems relating to furnishing, stability, doctoring and wash-up have had to be solved. One of the most mysterious and intriguing of these is known as "tarnishing". Since the solution of this problem involved some rather basic research, a few words here about it may prove interesting.

"Tarnishing", as the word indicates, is the formation of a thin film or scum of color on the reserve portions of the roller. This prints a haze of color on the fabric where it should remain white. This trouble has been more prevalent in oil-in-water systems than in reverse emulsions. Like many problems, the evidence was confusing and contradictory. Some colors tarnished in one plant and not in others. Gradually the evidence accumulated to prove that the cause was a surface relationship between the color and the engraved cylinder. In order for the doctor to quantitatively remove the color from the reserve portion, the color must wet the metal. If it does not wet it, instead of doctoring off a clean film, the action will break down the color into small globules, some of which crowd under the blade, lifting it slightly and depositing a film or scum.

This mechanism can be demonstrated (though it is not recommended) by putting water repellent on your windshield. You will find that the wiper will deposit a film of fine rain globules which will interfere with your vision.

Understanding this mechanism, one has to proceed to improve wetting. One solution is to treat the metal roller with a hydrophilic material to facilitate wetting with water. An interesting fact is that rollers coming out of the plating bath are very hydrophilic. Within a short time, however, they become difficult to wet. Absorption of carbonaceous microparticles from the air, or some change in the surface oxide are two possible explanations. In any case, when treated with a hydrophilic gum, they become easily wettable.

The other solution is to maintain maximum wetting in the color paste. This is difficult because excessive wetting agent causes foaming and loss of fastness, and possible loss of color value.

It is again one of the factors which emphasizes the complexity of color formulation.

CONCLUSION

In conclusion we can say that, in pigment printing, as in all technology, we are dealing with the complex forces of matter. We must understand the fibers which make up the fabrics we print. We must understand the mechanics of our printing processes, and we must think deeply into the relationships of these to the colors we apply. As we coordinate this thinking we shall make printing with pigment an increasingly efficient method and will widen the horizons of its possibilities.

Membership Applications

FEBRUARY 18—MARCH 2, 1960

NEW ENGLAND REGION

Northern New England Section

Junior

Donald E Robinson—Res & dev dept, The William Carter Co, Needham Heights, Mass. Sponsors: N S Dunten, R A Stowe.

Rhode Island Section

Senior

Thomas F Joyce—Chemist, Ansonia Mills, East Taunton, Mass. Sponsors: E J McNamara Jr, J P Ploubides.

CENTRAL ATLANTIC REGION

Metropolitan Section

Senior

Charles E Cooper—Salesman, The Harshaw Chem Co, Zinsser Div, Hastings on Hudson, NY. Sponsors: H W Dingee, J A Zelek.

Erhard A Zwingert—Lab tech, Putnam Chem Corp, Beacon, NY. Sponsors: A S Davis, A J Forman Jr.

Junior

Raymond Bertani—Tex colorist, Geigy Chem Corp, Yonkers, NY. Sponsors: R C Allison, E A Moggio.

Ronald H Mitchell—Tex chemist, Sandoz, Inc, New York, NY. Sponsors: C W Saalfrank, J O Whitaker.

Delaware Valley Section

Junior

Charles E Zortman—Lab tech & sales, Geigy Chem Corp, Philadelphia, Pa. Sponsors: F W Allendorf, K E Schmalenberger.

SOUTHERN REGION

Piedmont Section

Senior

William Q Goodman—Dir product dev, Cindet Chem Inc, Greensboro, NC. Sponsors: R A Bruce, R H Smith.

Walter T Holliday—Supv fabric dev, Riegel Textile Corp, Ware Shoals, SC. Sponsors: A T Clifford, A J Owens.

Transfer to Senior

Rufus P Anthony—Tech sales, Seydel-Woolley & Co, Atlanta, Ga. Sponsors: R E Rettew, R L Ward.

Jack A Dayvault—Dev chemist, Celanese Fibers Co, Charlotte, NC. Sponsors: V S Salvin, F Fortess.

Billy R Ezzell—Senior lab tech, Burlington Industries Inc, Burlington, NC. Sponsors: R E Rettew, C Hooper.

Dennis B Faw—Chemist, Cone Mills Research Lab, Greensboro, NC. Sponsors: R E Rettew, F S Perkerson.

Wayne H Lawson—Research engr, Fieldcrest Mills Inc, Spray, NC. Sponsors: J M Byrd, J W Arnall Jr.

South Central Section

Senior

Carl L Cochrane—Asst dyer, Osceola Finishing Co, Osceola, Ark. Sponsors: W O Neeb, J D Mosheim.

Dan J Criswell—Colorist, Mohasco Ind Inc, Greenville Mills Div, Greenville, Miss. Sponsors: E A Brophy, E V Helms.

Robert E Maher—Chief colorist, Alexander Smith Div, Mohasco Ind Inc, Mohawk Mills, Amsterdam, NY. Sponsors: E A Brophy, E V Helms.

Southeastern Section

Senior

Ben H Jackson—Plant mgr & chemist, Dixie Size & Chem Co, Columbus, Ga. Sponsors: L Tigler, T H McCamy.

Monroe C Ludewig—Tech sales rep, Celanese Chem Co, Div Celanese Corp of America, Atlanta, Ga. Sponsors: C B Ray, J E Barbre.

WESTERN REGION

Mid-West Section

Senior

Albert E Scharfetter—Dept mgr, Ribbon & Accessories Dept, American Greeting Card Corp, Cleveland, O. Sponsors: E Larrat, H F Lawton.

Student

Janice E Cunningham— Graduate student & teaching asst, Clothing & Textiles Dept, Purdue Univ, West Lafayette, Ind. Sponsors: R W Padgett.

Melba G Shilling—Student, Purdue Univ, West Lafayette, Ind. Sponsor: R W Padgett.

Delaware Valley Section———

ORLON CANTRECE—DU PONT'S NEWEST SWEATER FIBER*

HERBERT T PRATT

Technical Service Section, Textile Fibers Department
E I duPont de Nemours & Co, Inc
Wilmington, Del

INTRODUCTION

ORLON CANTRECE acrylic filament, Du Pont's newest sweater fiber, is a dyeable yarn designed especially for the knitting trade. Orlon Cantrece offers unlimited opportunities for making stylish garments. By using various textured yarns, garments of all types have been made ranging from the popular bulky knits to those with smooth hand and lustrous appearance of imported silk. Orlon Cantrece will also be used in other types of knitwear such as sport shirts and dresses. All of these garments have excellent "wash-and-wear" properties. They keep a neat appearance, resist wrinkling, and require a minimum of care since they can be machine washed and tumble dried.

DISCUSSION

PHYSICAL PROPERTIES ——— Orlon Cantrece is sold only as a 200-denier, 80-filament semidull yarn. It contains 0.3 turns per inch of producer twist. It is a reasonably strong fiber having a breaking tenacity of 3.0 grams per denier and a breaking elongation of 16 percent. Boil-off shrinkage is low, averaging about six percent.

The most important property of the yarn, as related to dyeing and finishing, is the ease with which it is stretched when hot. Like Orlon staple, it must be handled gently, especially under hot-wet conditions.

DYEING PROPERTIES———Orlon Cantrece acrylic filament is easy to dye. It has all the excellent dyeing characteristics of Orlon staple, and generally, formulas and methods that are used for Orlon staple are applicable. When dyed in the same bath with Orlon staple, Orlon Cantrece will be two to three shades lighter. In combination with other fibers, Orlon Cantrece can be cross dyed, left white, or union dyed the same as Orlon staple.

EFFECT OF TEXTURING——— Some Orlon Cantrece is being twisted into novelty yarns, but all of it that goes into sweaters is being textured. The choice of a texturing method depends largely on the type of hand desired in the finished garment. Torque-textured yarns such as Fluflon, Superloft, or Tycora yarns give a silk-like hand, whereas Taslan textured yarns give a more wool-like hand.

Taslan textured yarn is a stable bulked yarn. The looped filaments which give the yarn its bulk are not removed by gentle stretching or by heating. Garments of any construction from Taslan yarns of any degree of bulkiness can be piece dyed readily. The yarns increase in bulk slightly during dyeing because of the approximately six percent residual yarn shrinkage. Garment shrinkage is almost nil.

Garments from torque-textured yarns also shrink during dyeing. The amount of shrinkage will vary from only a slight change up to 25 percent depending on the yarn and fabric construction. Unlike garments from Taslan textured yarns, however, these garments lose bulk during piece dyeing. Torque-textured yarns are not stable at the boil and the bulked filaments tend to pull back into the yarn bundle. Therefore, to control this loss in bulk, the yarns must be properly constructed and the fabric must be knit tightly enough to hold the filaments in place.

COMPARISON WITH OTHER TEXTURED YARNS———By this time you are porbably wondering what textured yarns of Orlon Cantrece acrylic filament offer in comparison with other textured yarns with which you are familiar.

First of all, it is, so far as we know, the only textured yarn which will give a garment with a flat, lustrous, silk-like hand. Imported silk sweaters selling from $25 to $45 are in the fashion spotlight and for this reason designers are interested in this unique property in Orlon Cantrece.

Surface distortion is not a problem. Since this is a filament yarn, there are no fiber ends available for fuzzing or pilling.

Neither is pickiness a problem. Of course, yarns can be made with different amounts of bulk and slight pickiness may be noticed in maximum bulk yarns. Even so, the condition is negligible in comparison with garments from other textured yarns.

Garments from Orlon Cantrece have a warm, dry hand. Like Type 42 Orlon acrylic fiber, this new yarn has excellent wicking properties and gives body comfort in the same way as I described earlier for blends of Orlon and cotton.

Last, and this is most important, it is the only popular textured knitting yarn which can be used for ingrain work that will not bleed or fade during washing at 160°F. Of course, this will allow wide diversity in styling that just hasn't been possible before.

PIECE DYEING ——— Garments are piece dyed in paddle machines. Disperse dyes are used for light shades and cationic dyes for medium and heavy shades. The following is the recommended procedure for piece dyeing garments of Orlon Cantrece acrylic fiber.

1) Fold the garments and place them in mesh dye bags. Leave enough free space in the bag to permit a slight movement of the goods. With garments from torque-textured yarns, it may be necessary to experiment with the bagging density, since too much free space will allow the garment to be stretched during dyeing.

2) Scour the goods at 140°F for 10 minutes with 0.5 to 1.0 percent of a good detergent. For goods that will be dyed with cationic dyes, only nonionic detergents should be used. Higher scouring temperatures are not usually necessary, but if so, the bath should be cooled slowly after scouring to prevent

*Presented before the Delaware Valley Section on Sept 25, 1959 at Reading, Pa.

wrinkles. Rinse the goods by overflowing until the bath is clear.

3) Set a fresh bath at 140° F and add the chemicals and dyes.
4) Bring the bath to the boil at a rate of 1.5°F per minute and run for one to two hours depending on the depth of shade. Sample and make adds if necessary.
5) Cool the bath to 140°F at a rate of one to two degrees per minute. Slow cooling is necessary to avoid wrinkles and creases in the garments. If wrinkles are encountered even after slow cooling, reexamine the bagging conditions. Bags that are packed too tightly cause wrinkles. Overflow rinse and drop.
6) Scour the goods, if necessary, to remove excess dye. Cool slowly after dyeing depending on the scouring temperature.
7) From a fresh bath, apply a cationic softener, such as Avitex NA softener, Ceranine HC, or Velvetol AF. Two to three percent of softener applied for 20 minutes at 120°F usually is adequate. A small amount (0.2 to 0.3 percent) of glacial acetic acid in the bath aids exhaustion.
8) Centrifuge lightly to remove excess finish (bring machine to full speed and then stop it).
9) Tumble dry the loose sweaters at 160° to 180°F. Cool the goods slowly while the tumbling continues. To prevent wrinkles and a harsh hand, the tumbler should carry a reasonable-size load. (In drying samples, toss in a number of dye bags for filler.) Also, the tumbler basket speed should be low enough that garments are not held in one place by centrifugal force. Drying temperatures above 180°F should be avoided with torque-textured yarns, because some fabric constructions become sleezy.
10) Press the sweaters lightly on a flat-bed press using bottom steam only. Do not lower the head onto the sweater, but use a mitt or cloth-covered paddle to remove wrinkles and shape the garment.

PACKAGE DYEING——Torque-textured, package-dyed Orlon Cantrece acrylic filment yarns retain more bulk after finishing than do similar yarns after piece dyeing. Therefore, garments can be made from two-ply yarns, whereas three-ply yarns are used for piece-dyed garments. Also, package-dyed yarns offer the advantage of patterns and designs which cannot be readily attained by cross dyeing. For these reasons, some knitters prefer to use package-dyed yarns.

Good package dyeings can be made on producer twist yarn without relaxing the yarn beforehand, but to do so the dye packages must be carefully built. Good packages have been wound on both Foster 75 and Universal 50 machines at spindle speeds of 1050 to 1100 rpm and a two and one-half wind.

We ship Orlon Cantrece on tubes, with about two and one-half pounds of yarn per tube. The yarn stands should be set as low as possible and still keep a single balloon. In no case should the distance between the pigtail and the top of the tube be less than four inches.

The following are some additional points to bear in mind.

1) *Yarn Tensions and Backpress Pressure.* As a starting point for winding, we use five to six grams yarn tension and 150 grams backpress pressure. To keep yarn tensions low, it is important that the yarn balloon away from the supply package and not drag over it. The thread knock-off levers should be balanced so that they will just drop when the thread breaks. The weight on the lever should be low enough that the yarn is not bent through a very great angle.

   The backpress pressure should be so adjusted that, when the backpress is moved over into the doffing position, it will creep back slowly to the take-up spindle. On most winders, 150 grams backpress pressure, as measured with a spring scale when the roller bail is against the tube and the machine is running, will give a straight shouldered package. It is important to have the traverse frame and dogs clean and the compression springs set so as to give equal friction between the dog and frame of each spindle position. Otherwise, there will be a variation in package hardness.
2) *Type of Tube.* So far, we have used one-and-five-eighths inch steel tubes. Plastic and paper tubes cannot be used because they are crushed by the yarn shrinkage. Franklin and Davidson springs have not yet been tried, but probably would not be suitable since the yarn would shrink into the spring.
3) *Cushions.* It is not necessary to use a cotton cushion with this yarn. A knitted sock or nonwoven fabric is all that is needed between the yarn and tube.
4) *Package Weight.* We recommend a 10-ounce package to start with. Packages larger than 10 ounces have not been dyed in large lots. Laboratory dyeings of one-pound packages have been made with good results.
5) *Package Hardness.* Ten-ounce packages, when wound as described, will have a hardness of 30 to 35 on a Durometer type O Gauge. The hardness of the shoulders of the package will be between 50 and 65. Hardness readings on a Sipp-Eastwood hardness tester will be about 10 percent higher than for a Durometer.
6) A heavy knitted sock should be pulled over the outside of the package to prevent the yarn on the outside from becoming fluffy and matted during dyeing. The sock should fit tightly enough that it will not be forced off the package by the circulation of the dyebath.
7) Before dyeing, dye packages should be shaped to break and soften the shoulders.

DYEING METHOD——To avoid trouble with filtration, it is always best to use cationic dyes even in light shades. The following is suggested procedure for such dyeing:

1) Load carriers with the shaped packages using large cupped separators if they are available. Make sure that the yarn does not slide down the dye tube during loading, otherwise holes will be exposed in the tube and cause the dye liquor to by-pass the yarn.
2) Load the yarn into the machine and completely open the kier by-pass or throttle valve.
3) Set the machine on a reversing flow cycle of five minutes outside-in and four minutes inside-out. This cycle avoids undue mechanical action on the package before the yarn shrinks to the tube.
4) Fill the machine, start the pump, and then close the by-pass valve to give an outside-inside pressure of no greater than 45 psig. High pump pressures and high rates of flow destroy the package wind. The stretch resistance of Orlon Cantrece acrylic filament falls off rapidly as the temperature goes up. At the boil,

the packages become quite soft and are easily distorted. During the dyeing, try to maintain at least 10 to 15 psig differential between the outside and inside pressures.

5) Raise the bath temperature to 120°F. Scour with 0.5 percent of a nonionic detergent, such as Alkanol HCS surface-active agent, for 10 minutes and drop the bath.
6) Hot rinse at 120°F for five minutes and drop.
7) Set a fresh bath at 140°F and add the chemicals and dyes.
8) Check the pH. It should be between 4.5 and 5.0.
9) Raise the bath temperature rapidly to 170° F at three degrees per minute, to 190° F at a rate of two degrees per minute, and then to 208° F at one degree per minute. (Close the by-pass valve to maintain the proper pressure.)
10) Dye for one and one-half to two hours depending on the depth of shade. Sample and make adds if necessary.
11) Cool slowly by radiation to 160° F (open the by-pass valve if the pressure goes above 45 psig), overflow rinse and drop.
12) Set a fresh bath at 160° F and scour with one percent of a nonionic detergent, such as Alkanol HCS surface-active agent, for 15 minutes.
13) Hot rinse at 140° F for 10 minutes and then overflow rinse until cold and drop.
14) Apply 0.5 to 1.0 percent of a cationic finish at 140° F for 10 to 20 minutes.
15) Dry on port dryers or in trays. If the yarn is centrifugally extracted, it can be backwound directly without drying.
16) Do not apply an oil during backwinding without consulting the throwster. Oils and finishes that are applied during winding or finishing "flash off" during torque texturing, which is undesirable. It is best to consult the throwster also on the amount of oil or finish to use.

FINISHING GARMENTS FROM PACKAGE-DYED YARNS —— Sweaters made from package-dyed yarns are finished about like piece-dyed sweaters, or sweaters from Type 42 Orlon acrylic fiber. The following is the recommended procedure for finishing these garments.

1) Bag the garments as for dyeing and scour them in a paddle machine at 120° F with 0.5 percent of a nonionic detergent, such as Alkanol HCS surface-active agent.
2) After rinsing, set a fresh bath at 120° F and apply two to three per cent of a cationic softener as for piece-dyed sweaters.
3) Centrifuge lightly to remove excess finish.
4) Tumble dry at a temperature no higher than 180° F. Cool the garments while tumbling continues to prevent wrinkling. In hot tumbling, the yarns gain a certain amount of bulk. With some fabric constructions, it may be advantageous to hot tumble the garments at 170° F for about 10 minutes before wet finishing.

Delaware Valley Section——

FINISHING BLENDS OF ORLON AND COTTON IN UNDERWEAR*

HERBERT T PRATT

Technical Service Section, Textile Fibers Department
E I duPont de Nemours & Co, Inc
Wilmington, Del

INTRODUCTION

OF the many applications for Orlon acrylic fiber, men's underwear is one of the newest and most interesting. For this reason, I would like to confine my remarks to this end use.

Men's underwear, long the stronghold of cotton, is a stereotyped product; at least it was until Orlon got into the act. Underwear is white, and although it is knit in various rib and jersey constructions, brands of underwear in a given price range all look, feel, and wear pretty much alike to the consumer it is only when you change the fiber that you get a significant change in the characteristics of the underwear.

A perfect example of this is underwear from a blend of 80 percent one-denier Orlon and 20 percent pima cotton. This blend gives underwear that is comfortable in all kinds of weather, hot or cold.

In warm weather, Orlon picks up perspiration from the skin rapidly and carries the moisture to the outer surface of the fabric where it evaporates readily. Since the moisture is held between the fibers, not inside them, it evaporates readily. This constant evaporation cools the body.

In cold weather, the fuzzy surface texture of yarns of Orlon acrylic fiber minimizes intimate contact with the body and therefore minimizes conduction of heat from the body through the fiber. In addition, the high fabric bulk gives good insulation and provides warmth without excessive weight.

I have several T-shirts of 80 percent Orlon and 20 percent cotton which I would like you to examine after the program. If you have never worn or felt this underwear, you have missed one of the best selling points. Orlon gives underwear a soft, luxurious, almost cashmere-like hand. This soft hand will be retained through repeated washings, even after a similar cotton garment would have worn out.

No doubt some of you are asking "Why use 20 percent cotton?" This is added to eliminate any static that might develop. Twenty percent seems to be sort of a magic amount since lesser amounts do not give adequate static protection and greater amounts harshen the hand and may give a fabric with poor dimensional stability.

To sum it up, Orlon acrylic fiber offers comfort and luxury in underwear and is being sold on this basis.

BLEACHING PROCEDURES

Gradual improvements in the whiteness of Orlon have eliminated the need for bleaching it for many end uses, but for underwear, we like

*Presented before the Delaware Valley Section on Sept 25, 1959 at Reading, Pa.

to get the very best white that is possible.

The simplest way to bleach fabrics of Orlon acrylic fiber and cotton is with sodium chlorite, since both fibers can be bleached at one time. Optical whitening agents also can be incorporated into the bleach bath for further whitening the Orlon, thus reducing the method to a one-bath procedure.

In setting up procedures for bleaching, it is important to remember two things:

1) Orlon can be stretched and distorted easily under hot-wet conditions. In fact, the force required to stretch a one-denier fiber by one percent at the boil is only about 0.5 percent of the force required at room temperature.
2) Orlon can be discolored or weakened by hot alkaline solutions. In alkaline scouring and mote removal, it is best that the temperature not exceed 160°F. Mote removal is not much of a problem since only combed cottons are used.

For processing in a beck, the knit tubing should be sewn together at the ends to form a continuous tube. The fabric is scoured for 20 to 30 minutes at 160°F in a bath containing a good detergent built with TSPP. After rinsing, the goods are ready for bleaching. The material is treated for one hour at 190°F in a bath containing 1.5 g/l sodium chlorite and 0.5 g/l nitric acid (61 percent). After bleaching, the material is cooled slowly, thoroughly rinsed, and scoured to remove traces of residual acid. To avoid creases and wrinkles, fabrics must always be cooled slowly after hot-wet processing in rope form. The higher the processing temperature, the more slowly the bath should be cooled.

Neither the Orlon acrylic fiber nor the cotton is harmed by this bleach. However, the cotton can be degraded if the concentration of acid is exceeded or if all traces of acid are not rinsed out of the fabric before it is dried.

If you want to whiten the Orlon even more, add a small amount of a fluorescent brightener, such as Uvitex A, to the bath. The amount that is used is determined largely by the cast desired. Amounts up to 0.5 percent give a green cast to the goods. Shading towards a bluer white can be obtained by applying 0.001 to 0.002 percent of Latyl Blue RB dye applied from a fresh bath at the boil for one-half hour.

Because acidified sodium chlorite is highly corrosive, the equipment should be of stainless steel, preferably Type 316. Experience has shown that pitting of stainless steel is retarded by using nitric acid with the sodium chlorite bleach. Recently a number of inhibitors have been offered on the market which I believe are organic esters of various types. These inhibitors reportedly give good protection to the equipment and reduce fuming to the point that it is no problem. However, inhibitors slow down bleaching and the motes may be bleached more slowly.

Another way of bleaching blends of Orlon and cotton is with formic acid. The white obtained by this procedure is stable to repeated washings, is moderately stable to light, and is exceptionally stable to dry heat. The fabric is scoured in the same way as for bleaching with sodium chlorite and then the cotton is bleached for one hour at 160°F in a bath containing 5.0 g/l each of hydrogen peroxide and sodium silicate. The pH of the bleach bath should not exceed 10.0 and the temperature should not exceed 160°F. A higher pH or higher temperature can cause permanent yellowing of the Orlon acrylic fiber.

After the cotton is bleached, the fabric is washed and the Orlon is whitened by treating the fabric for one to one-and-one-half hours at the boil in a bath containing (based on the weight of the fabric) three percent formic acid (90 percent), Glauber's salt, a wetting agent and optical whiteners. The cast of the white can be altered by varying the type and the amount of fluorescent brightener. For example, Uvitex A imparts a green cast, while CI Fluorescent Brightener 55 gives a pink cast to the goods.

FINISHING

The keynote to good finishing is slow cooling to avoid creases and wrinkles, and processing under relaxed conditions. If the goods get stretched in length while in the beck, it must be relaxed during finishing to insure a stable fabric. The cloth cannot be stabilized wider than the relaxed width. Knit fabric of 80 percent Orlon and 20 percent cotton has excellent stability if it is finished under relaxed conditions, and underwear that is on the market today has no more than three percent shrinkage.

Cationic finishes can be applied either by exhaustion from the bath or by padding. Practically all finishes impart some yellowness to Orlon acrylic fiber, so only a minimum amount should be used. In applying the finish, it is also possible to apply an optical whitener for the Orlon at the same time; however, this procedure is apt to give streaky goods.

In drying, temperatures should not exceed 230°F; otherwise there may be some yellowing. The goods are finished by steaming on a tensionless calender using overfeed to eliminate potential lengthwise shrinkage.

The procedures I have described are covered more fully in Du Pont technical bulletins, which may be obtained on request.

Employment Register

This column is open for two insertions per year, per member, without charge. Blanks may be obtained from, and filed with, the secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the secretary.

60-4

Education: Diploma, textile mfg; Certificate, paper chemistry.

Experience: Sales engineer, technical sales—sales service.

Position desired: Tech sales—sales service.

Location: Carolinas (open).

Age: 51; married, one dependent, excellent references.

60-5

Education: June 1960 graduate, Rhode Island School of Design; organic chemistry major, textile minor.

Position desired: Chemical laboratory.

Veteran.

SOUTH CENTRAL SECTION MEETING DATE CHANGED

THE September 1960 meeting date of the South Central Section has been changed from September 10 to the 17th. The meeting will be held in Knoxville, Tenn, at the Andrew Jackson Hotel with Jack McNab, Mac Chemical Co, in charge.

COUNCIL HIGHLIGHTS

218th Meeting • Sheraton Atlantic Hotel, New York, NY • January 22, 1960

COUNCIL has approved a pension plan submitted by the Employee Retirement and Pension Committee. The Plan, hammered out by the Committee headed by Walter J Hamburger, Fabric Research Laboratories, Inc, is expected to be put into effect shortly. It will benefit full-time employees of the Association.

* * *

The report of the Committee on Long-Range Objectives, headed by FRL's Ernest R Kaswell, was accepted by Council and referred to the Executive Committee for study and recommendation to Council for implementing at the proper time those provisions the Council considers desirable. (See pages 48-51, 56 of the February 22, 1960 issue of *American Dyestuff Reporter* for full text of the report). Council expressed its appreciation for the thorough job done by the Committee.

* * *

Two special resolutions were read to Council by President Weldon G Helmus, one in memory of the late Raymond W Jacoby, and another honoring P J Wood for his 22 years service as a member of the Appropriations Committee.

The resolution in memory of Mr Jacoby read as follows:

"WHEREAS Raymond W Jacoby, having achieved a record of outstanding accomplishments during his lifetime,

"WHEREAS during his sixteen years as a member of the American Association of Textile Chemists and Colorists, which he served in numerous capacities of responsibility in the Rhode Island Section, on Committees of the Council and Research Committees, Olney Medalist in 1951, as president of the Association in 1955 and 1956 and as chairman of the Executive Committee of the Perkin Centennial commemorating the one hundredth anniversary of the discovery of aniline dyes, therefore be it

"RESOLVED that the Council of the American Association of Textile Chemists and Colorists in regular meeting assembled, honor the memory of Raymond W Jacoby and extend condolences to his family, and be it

"FURTHER RESOLVED that this resolution be spread on the minutes of this meeting and that a copy signed by the president and the executive secretary be sent to Mrs Jacoby."

The resolution honoring Mr Wood read as follows:

"WHEREAS P J Wood has faithfully and continuously served as a member of the Appropriations Committee since its establishment in 1944 and previously on the Finance Committee, having been appointed as its first Chairman on December 2, 1927,

"WHEREAS The General and Research Fund in November, 1927 was $6,341.71 and in 1960 is over a half million dollars,

"RESOLVED that the Council express its sincere thanks and appreciation to Mr Wood for his guidance of the Association's finances over a thirty-three years during AATCC's great period of growth and development, and be it

"FURTHER RESOLVED that this be spread on the minutes of this meeting."

* * *

President Helmus, beginning his second year as president, introduced A Henry Gaede, newly elected vice president from the Southern Region, and Joseph H Jones, newly elected vice president from the Western Region. He also read off a list on new Councilors, as follows: J J O'Neill Jr, Northern New England; A F McLean and R B Taylorson, Rhode Island; A W Goodwin, Western New England, L K McChesney, Delaware Valley: W A Holst, R E Miller, and E I Stearns, Metropolitan; J E Loughlin, Niagara Frontier; J C King and C L Zimmerman, Piedmont; R N Ingram, South Central; J C Cook, Southeastern; J G Kelly and A J Olsen, Mid-West.

* * *

The Executive Committee's recommendations for Council Committee appointments for 1960 were approved as follows:

EXECUTIVE COMMITTEE OF THE COUNCIL———W G Helmus, *chairman;* C T Anderson, A H Gaede, J H Jones, G O Linberg, W G Parks, G P Paine, C A Sylvester, A R Thompson.

EXECUTIVE COMMITTEE ON RESEARCH———C A Sylvester, *chairman;* G S Wham, *vice chairman;* H W Stiegler, *secretary;* F Fortess, P J Fynn, S J Kennedy, G O Linberg, H E Millson, J D Mosheim, E Morrill.

PUBLICITY———E Artim, *chairman;* chairmen of Section Publicity Committees ex-officio members.

TECHNICAL SUPPLIES———G P Paine, *chairman;* W G Helmus, H W Stiegler, C A Sylvester, A R Thompson.

PUBLICATIONS———P J Luck, *chairman;* N A Johnson, *secretary;* W D Appel, E Artim, M A Dahlen, W A Holst, G D Jackson Jr, A E Johnson, E W Lawrence, G O Linberg, E Morrill, H A Rutherford, P B Stam, C A Sylvester, C A Whitehead.

CONSTITUTION AND BYLAWS ———W A Holst, *chairman;* W B Griffin, E R Kaswell.

CORPORATE MEMBERSHIP———C T Anderson, *chairman;* G Paine, *secretary;* vice presidents are vice chairmen ex-officio; chairmen of Section Corporate Membership Committees ex-officio members.

TECHNICAL PROGRAMS ——— S G Turnbull Jr, *chairman.*

INTERSECTIONAL CONTEST ———T J Gillick Jr, *chairman.*

CONVENTIONS ——— E Morrill, *chairman;* T R Foltz Jr, J L McGowan, one year; W B Griffin, R B Taylorson, two years; F V Traut, J G Kelley, three years; P J Fynn, W H Leyking, four years.

SUBJECT AND SPEAKERS BUREAU——— M J Babey, *chairman;* C A Whitehead, *secretary;* Section Program Chairmen ex-officio members.

ARCHIVES———S M Edelstein, *chairman;* N A Johnson, E W Lawrence, M J Lydon, A R Thompson, P J Wood.

INTERSOCIETY RELATIONS———A E Johnson, *chairman;* W F Appel, F Fortess, R B Hallowell, G O Linberg, C A Sylvester.

TECHNICAL COMMITTEE ON RESEARCH———G S Wham, *chairman;* F Fortess, *vice chairman;* G J Mandikos, *secretary;* chairmen of Research Committees and Councilors representing Sections, ex-officio members.

TEXTILE EDUCATION———Leonard Smith, *chairman;* W C Caldwell, H Y Jennings, H E Millson, R B Stehle.

EMPLOYEE RETIREMENT & PENSION ——— W J Hamburger,

chairman; E J Chornyei, C Z Draves, R G MacDonald, L Smith, A R Thompson, P J Wood.

STUDY COMMITTEE ON INTERSECTIONAL CONTEST——T J Gillick Jr, *chairman:* L J Armstrong, W B Griffin, T H Hart, J D Mosheim, A H Rant, F J Rizzo, N A Truslow.

STUDY COMMITTEE ON LONG-RANGE OBJECTIVES——E R Kaswell, *chairman;* J R Bonnar, M A Dahlen, F Fortess, M Harris, S J Kennedy, C A Sylvester, N A Truslow.

STUDY COMMITTEE ON ENDOWMENT FUND——P J Wood, *chairman;* H F Herrmann, A R Thompson.

INDIVIDUAL MEMBERSHIP——H A Stauderman, *chairman;* W F Schultz, *vice chairman;* R P Monsaert Jr, *secretary;* chairmen of Section Individual Memberhip Committees, ex-officio members.

STUDY COMMITTEE ON LOCATION OF NATIONAL HEADQUARTERS——S M Cone Jr, *chairman;* J H Jones, E R Kaswell, S I Parker, R B Stehle.

STUDENT AWARD——J Lindsay Jr, *chairman;* G P Paine, *secretary;* heads of Textile Chemistry Departments of Textile Schools with Student Chapters, ex-officio members.

The president and executive secretary are ex-officio members of all committees, and in certain instances are specifically designated members according to the Bylaws.

* * *

Reporting for the Committee on Membership and Local Sections, W G Parks noted that AATCC membership as of January 18 was 7187. Applications awaiting acceptance totaled 121.

* * *

For the Committee on Corporate Membership, outgoing chairman A E Johnson summarized the work of the committee during his tenure. Mr Johnson called attention to a new brochure prepared by National Headquarters, entitled "Dividends from Research". This report to AATCC Corporate Members points up what the Corporate Member is receiving for its investment, outlines the research structure of the Association, shows how the research program is financed, and carries a suggested dues schedule.

President Helmus on behalf of the Council thanked Mr Johnson for his past service on the Committee.

* * *

Charles W Dorn, delivering his final report as chairman of the Executive Committee on Research, asked for approval of several new TCR Committee appointments (see minutes of 201st meeting of TCR in the March 7 issue). These were approved by Council. Mr Dorn also advised that ECR had reviewed the status of several Reference Committees, namely, RR1, RR5, RR10, RR14, RR17, and RR26.

Mr Dorn asked the Executive Committee to investigate the publicity aspects of the work of Research Committees, as it was felt that Research Committee personnel were not receiving sufficient recognition of their efforts.

Mr Dorn also stated that ECR had reviewed an article, which had appeared in the *Proceedings,* in which certain standards expressed were in "reverse order" to the AATCC standards. He stated that ECR had voted to ask the Publications Committee to set up some mechanism whereby articles of this nature could be reviewed so that whenever possible, they would conform with established AATCC nomenclature.

* * *

Council has delegated to the Appropriations Committee the authority to deal in securities as prescribed in in Article IV, Section 6, of the Bylaws. Standard & Poor's, New York, NY, has been named to provide investment advisory service for the Association.

Council approved and the Appropriations Committee has made available funds for the purchase of new office equipment at National Headquarters.

* * *

Fred V Traut, chairman of the 1960 Convention, reported that plans are well underway for the three-day affair, which will be held at Philadelphia's Sheraton Hotel, October 6-8.

* * *

Council will hold its 219th meeting on the afternoon of May 27, 1960 at the Sheraton-Atlantic, New York, NY. Council also elected to meet in Atlanta, Ga, on the afternoon of Sept 9, in conjunction with a meeting of the Southeastern Section. Council committees and research committees will meet on Sept 8. TCR and ECR will meet the morning of the 9th.

CALL FOR NOMINATIONS FOR THE HAROLD C CHAPIN AWARD

THE Harold C Chapin Award may be presented annually, at the National Convention, to a Senior member, of at least twenty years continuous membership, who has contributed outstanding service in enabling the Association to attain the objectives for which it was founded.

The selection is the unanimous choice of a committee consisting of one member from each of the four national regions, selected by the councilors of the respective regions; the president of the Association, ex-officio; and the executive secretary serving as secretary of the committee without vote.

The membership of the Committee as constituted for 1960 is as follows:

D W Robinson, *chairman,* Central Atlantic Region—one year

S Springer, Western Region—two years

A H Gaede, Southern Region—three years

A D Nute, New England Region—four years

W G Helmus, ex-officio

G P Paine, *secretary.*

The Award is a suitably worded, framed, illuminated scroll.

Members of the Association are requested to submit to the Committee, through the secretary, prior to May 1, 1960, the names of those members deserving consideration for the Award.

Please address your nominations to:

G P Paine, executive secretary,
AATCC National Headquarters,
P O Box 28,
Lowell, Mass.

Elected to Membership

No designation after name indicates Senior
(A) indicates Associate
(J) indicates Junior
(S) indicates Student
*indicates transfer from another class of membership

FEBRUARY 25, 1960

NEW ENGLAND REGION

Northern New England Section

*Harry A Freedman**

Rhode Island Section

Richard J Mahoney
*Harry J Baumeister**

Western New England Section

John D Hancock

CENTRAL ATLANTIC REGION

Delaware Valley Section

Martin F Monihan (A)

Metropolitan Section

James I Beam
Vincent J Zaretski
George H Hansen (A)
*Mary L Silva**
*Keith R J Horner**

SOUTHERN REGION

Piedmont Section

*Clyde B Anderson**
*Thomas M Griffin**
*Henry C Hagans**
*Alston Ramsey Jr**

Southeastern Section

Dennis E Shea
Charles H Adams (A)

Washington Section

Arthur Mason DuPre Jr

WESTERN REGION

Pacific Southwest Section

Myron A Herschler

UNCLASSIFIED

Ernest S Beton
Henry Biberfeld
Edgar Brunner
Kalevi Tassi Varis
So Sun Bai (S)

MARCH 8, 1960

NEW ENGLAND REGION

Northern New England Section

John H Malay
Justin Burnes (A)

Rhode Island Section

John F Brennan
Charles E Brown Jr
Dennis Almeida (A)

CENTRAL ATLANTIC REGION

Delaware Valley Section

*Howard A Koller**

Metropolitan Section

Arthur H Allen
Hans F Beckedorf
Charles Brdlik
Louis J Fagnoni
Edward Lieberman
John J Marvin
*Mark R Schiff**

SOUTHERN REGION

Piedmont Section

Tom Harrison
Walter B Hawkins
Eugene W Jones
David G McRitchie
Thomas H Newman
John A Wolhar
William S King (J)
*George K Blanton**
*Kenneth A Jenkins**
*Robert R King**
*William A Mills III**

South Central Section

Eugene T Isbill

Washington Section

T Faye Mitchell (A)

STUDENT CHAPTER

Georgia Institute of Technology

John R McCulloch (S)

UNCLASSIFIED

Austin J Straw
Henry S Blair
George A Fowler (A)
*Roberto Facusse**
*Lewis J Turner Jr**

AATCC Calendar

COUNCIL, COUNCIL COMMITTEES, RESEARCH COMMITTEES
May 26-27 (Hotel Sheraton-Atlantic, New York, NY); May 26—Council Committees and Research Committees; May 27 (AM)—ECR, TCR; May 27 (PM)—Council

NATIONAL CONVENTIONS
Oct 6-8, 1960 (Sheraton Hotel, Philadelphia, Pa); Sept 28-30, 1961 (Buffalo, NY); 1962 (Southern Region)

DELAWARE VALLEY SECTION
Apr 22 (Ladies Night, Northeast Shrine, Rockledge, Pa); May 20 (Outing, North Hills CC, North Hills, Pa); Sept 16 (Reading, Pa); Nov 4, Dec 9 (Philadelphia, Pa)

HUDSON-MOHAWK SECTION
Mar 27 (Chelsea House, Tribes Hill, NY); May 20 (Ladies Night); June 24 (Annual Outing)

METROPOLITAN SECTION
Apr 22 (Kohler's Swiss Chalet, Rochelle Park, NJ); May 20 (Ladies Night—Swiss Chalet); June, 1960 (Outing)

MID-WEST SECTION
Apr 30 (Schroeder Hotel, Milwaukee, Wis); June 18 (Outing, Cerami's Island View Resort on Browns Lake, Burlington, Wis)

NIAGARA FRONTIER SECTION
Apr 22 (Buffalo, NY)

NORTHERN NEW ENGLAND SECTION
(Colonial Country Club, Lynnfield, Mass); May 13 (Lowell Tech Inst, Lowell, Mass); Sept 9 (Outing—Wachusett Country Club, West Boylston, Mass); Oct 21 (Hotel 128, Dedham, Mass); Dec 9 (Colonial Country Club, Lynnfield, Mass); Jan 20, 1961 (Hotel 128, Dedham, Mass)

PAC FIC SOUTHWEST SECTION
May 13 (Rodger Young Auditorium, Los Angeles, Calif); July 16 (picnic); Sept 24-25 (Outing—Apple Valley, Calif); Nov 18 (Rodger Young Auditorium, Los Angeles, Calif); Dec 10 (dance)

P"EDMONT SECTION
Apr 2-3 (Hotel Robert E Lee, Winston-Salem, NC); June 3-4 (Outing—Ocean Forest Hotel, Myrtle Beach, SC); Sept 23-24 (Hotel Charlotte, Charlotte, NC)

RHODE ISLAND SECTION
Mar 25 (Providence Engineering Soc); Apr 29 (Student Night); June 24 (Outing—Metacomet Country Club); Sept 23 (Management Night); Oct 28 (Providence Engineering Society); Dec 2 (Annual Meeting—Johnson's Hummocks)

SOUTH CENTRAL SECTION
May 13-14 (Outing—Riverside Hotel, Gatlinburg, Tenn); Sept 17, Dec 9 (Hotel Patten, Chattanooga, Tenn)

SOUTHEASTERN SECTION
Apr 16 (Ida Cason Callaway Gardens, Pine Mountain, Ga); June 10-12 (Outing—Radium Springs Lodge, Radium Springs, Ga); Sept 10, Dec 3 (Atlanta Athletic Club, Atlanta, Ga)

WESTERN NEW ENGLAND SECTION
Apr 8 (Rapp's Restaurant, Shelton, Conn); May 6 (Ladies Night, Rapp's Paradise Inn, Ansonia, Conn); June 10 (Outing, Wallingford Country Club—tentative); Sept 23 (Blake's Restaurant, Springfield, Mass); Oct 21 (Annual Meeting, Rapp's Restaurant, Shelton, Conn); Dec 2 (Rapp's Restaurant, Shelton, Conn)

Future Papers

The following list is comprised of titles of papers submitted to date for publication in future issues of the Proceedings. Authors and Technical Program Chairmen are requested to examine this list and call our attention to any omissions.

1959 Convention Papers

"Fluorescent Brighteners and Bluing Agents in Wool Processing"—Delaware Valley Section

"Man-made Cellulosic Fibers in 'Wash-and-Wear'"—A B Hilton, G V Lund, and A E Martin Jr, Courtaulds (Alabama) Ltd

"Retrospect and Prospect: Progress and Problems in 'Wash-and-Wear'—Preliminary Report" — Pauline B Mack, Marguerite C Barra, Attelia L Muller, and Elizabeth F Thomas, Texas Woman's Univ

"Twelve Million Yards of Natural and Man-made Fibers Dyed on the Swedish Pad-Roll Dyeing Machine" Robert M Lesh, Northern Dyeing Corp

"The Monforts Reactor—A New, Continuous Dyeing Machine"—Joachim C Roehl, A Monforts Machine Works

Papers presented before Local Sections

"The I-T Process for Applying Cationic Dyes to Acrylic Fibers"—J A Leddy, Geigy Dyestuffs

"Chemical Principles of Dyeing and Finishing"—Robert A Brooks, E I duPont de Nemours & Co, Inc

"Production of Man-made Fibers"—S L Hayes Jr, E I duPont de Nemours & Co, Inc

"New Developments in Dyeing and Printing Polyester Fibers"—Dorel Marian, Compagnie Francaise des Matieres Colorantes

"The Dyeing of Acrilan 16 and Acrilan 16/Acrilan Blends"—Thomas E Croxon, The Chemstrand Corp

"Procinyl Dyestuffs—Novel Disperse Reactive Dyestuffs for Nylon"—Raymond Thornton, Arnold, Hoffman & Co, Inc

ACTIVITIES OF THE LOCAL SECTIONS

HUDSON-MOHAWK SECTION HONORS PAST CHAIRMEN—Past chairmen of the Hudson-Mohawk Section who were present at the January 15th meeting to receive certificates were, l to r: David Hamer, Arkansas Co; Albert E Herrmann Jr, General Aniline Works; Irwin J Smith, Surpass Chemical Co, Inc; Edward A Chevrette, Apex Chemical Co; and Maurice Fishman, Lee Dyeing Co

Hudson-Mohawk

A SEVERE ice storm did not prevent thirty-seven members and guests from attending the January 15th meeting of the Hudson-Mohawk Section held at the Chelsea House, Tribes Hills, NY.

Speaker of the evening was Raymond Thornton, technical service manager, Arnold, Hoffman & Co, Inc, whose topic was "Procions and Procinyl Range of Fiber-Reactive Disperse Dyes for Nylon". The question-and-answer period which followed Mr Thornton's presentation was led by Vice Chairman Achilles Mafilios.

A special feature of the meeting was the presentation of Certificates of Service to the Section's past chairmen: Maurice Fishman (1958-9), Edward A Chevrette (1957-8), Albert E Herrmann Jr (1956-7), William A Nelson (1955-6), Harvey G Gendreau (1954-5), Irwin J Smith (1953-4), Harold Dahlberg (1952-3), John J Hanlon (1951-2), and David Hamer (1950-1). The award to Jack Epelberg (1949-50), the Section's first chairman, was presented posthumously.

The Section will meet this Friday, March 25 at the Chelsea House. Ernest Yeadon, Bradford Dyeing Assoc, Bradford, England, will speak on "Dyeing in England as Compared with Dyeing in the United States."

•

Piedmont

PIEDMONT SECTION will hold its Spring Meeting April 2 at the Robert E Lee Hotel, Winston Salem, NC.

The schedule calls for a regular meeting of the General Research Committee in the State Room beginning at 10 am. The Officers Luncheon will follow at 12:30 pm in the Winston Room.

Speakers at the afternoon technical session, beginning at 2 pm, will be Charles H A Schmitt, director of application research and development, Sandoz, Inc, and I H Welch Jr, Technical Textile Service Dept, American Viscose Corp. Mr Schmitt will discuss "Lightfastness of Dyestuffs" and Mr Welch will speak on "Modified Viscose Type Fibers".

"Bones" McKinney, basketball coach at Wake Forest College, will be the banquet speaker. There will be entertainment during the banquet.

•

Metropolitan

METROPOLITAN SECTION met February 19 at the Hotel New Yorker, New York, NY, with 172 in attendance. Chairman John A Komninos presided.

Speaker of the evening was Thomas E Croxon, group leader, Dye Applications Group, The Chemstrand Corp, Decatur, Ala. In his talk, entitled "The Dyeing of Acrilan/Acrilan 16 Blends", Mr Croxon explained that such blends make it possible to piece dye greige fabrics in a wide variety of exciting heathers, stripes, and other multicolor combinations. This new development reportedly makes it possible to reduce costs and to offer greater color line flexibility.

Northern New England

NORTHERN NEW ENGLAND SECTION has scheduled meeting dates and places for 1960-61 season as follows:

May 13, 1960—Lowell Technological Institute, Lowell, Mass

September 9, 1960 — Wachusett Country Club, West Boylston, Mass (Outing)

October 21, 1960—Hotel 128, Dedham, Mass

December 9, 1960—Colonial Country Club, Lynnfield, Mass

January 20, 1961—Hotel 128, Dedham, Mass

•

Southeastern Section Meeting

February 13, 1960 • Ida Cason Callaway Gardens, Pine Mountain, Ga

(See report on page 56 of March 7 issue)

C L Adams, head, School of Textile Technology, Auburn Univ, Auburn, Ala, guest speaker at Southeastern Section's Feb 13 meeting

B S Daniel, Lanett Bleachery and Dye Works, led discussion on fabric preparation at Southeastern Section meeting of Feb 13

Piedmont Section Winter Meeting

January 23, 1960 • Poinsett Hotel, Greenville, SC

(See report on page 56 of March 7 issue)

L to r: R L Ward, Leaksville Woolen Mills, Piedmont Section treasurer; D Stewart Quern, Becco Chem Div, FMC, chairman of the Section's Auditing Committee; and Richard E Rettew, Polymer Southern, Section secretary, discuss "bookkeeping techniques" for the coming year at Winter meeting of Piedmont Section.

R C Edwards, president, Clemson College, banquet speaker at Piedmont Section meeting of Jan 23

Neal A Truslow, U S Rubber Co (left) and Joseph C King, Metro-Atlantic, Inc, Piedmont Section Councilors

W F Robertson, Riegel Textile Corp, is shown addressing the Piedmont Section's Research Committee as Fred Fortess, Celanese Corp of America, chairman of the Research Committee, looks on.

W F Robertson, Riegel Textile Corp (left), and S Y Stribling III, Hilton-Davis Chemical Co, discuss matters following meeting of the Piedmont Section Research Committee on Jan 23

ORGANIZATION OF THE AATCC

FOUNDER

LOUIS A OLNEY
(deceased)

COUNCIL OF THE ASSOCIATION

PRESIDENT ..... WELDON G HELMUS, Fair Lawn Finishing Co, Fair Lawn, NJ

VICE PRESIDENTS ..... *(New England Region)*: W GEORGE PARKS, University of Rhode Island, Kingston, RI; *(Central Atlantic Region)*: C T ANDERSON, Ciba Co, Inc, 4241 N 2nd St, Philadelphia, Pa; *(Southern Region)*: A HENRY GAEDE, Laurel Soap Mfg Co, PO Box 1083, Charlotte 1, NC; *(Western Region)*: JOSEPH H JONES, Phoenix Dye Works, 4755 W 150th St, Cleveland 35, O.

TREASURER ..... ARTHUR R THOMPSON, Ciba Co, Inc, PO Box 1988, Charlotte 1, NC

EXECUTIVE SECRETARY ..... GEORGE P PAINE, AATCC National Headquarters, PO Box 28, Lowell, Mass

CHAIRMAN, EXECUTIVE COMMITTEE ON RESEARCH ..... CHARLES A SYLVESTER, E I duPont de Nemours & Co, Inc, Rm 8516, Nemours Bldg, Wilmington 98, Del.

PAST PRESIDENTS (Living) ..... ELVIN H KILLHEFFER, P J WOOD, WILLIAM H CADY, CARL Z DRAVES, THOMAS R SMITH, WILLIAM D APPEL, HENRY F HERRMANN, C NORRIS RABOLD, J ROBERT BONNAR, GEO O LINBERG

NATIONAL COUNCILORS REPRESENTING SECTIONS
(Northern New England): J J O'NEILL JR, R J PEIRENT, G F QUIGLEY; *(Rhode Island)*: R F CAROSELLI, E W LAWRENCE, A F McLEAN, R B TAYLORSON; *(Western New England)*: A W GOODWIN; *(Delaware Valley)*: T H HART, L K McCHESNEY, M J REIDER, D W ROBINSON, W S SOLLENBERGER; *(Hudson-Mohawk)*: J J HANLON; *(Metropolitan)*: W A HOLST, P J LUCK, R E MILLER, R P MONSAERT JR, B F QUIGLEY, E I STEARNS, G S WHAM; *(Niagara Frontier)*: J E LOUGHLIN; *(Piedmont)*: J C KING, E A MURRAY, W E RIXON, R E RUPP, N A TRUSLOW, C L ZIMMERMAN; *(South Central)*: R N INGRAM, J D MOSHEIM; *(Southeastern)*: J C COOK, W E FAYSSOUX, J W RICHARDSON; *(Washington)*: L SMITH; *(Mid-West)*: A I HULTBERG, J G KELLEY, A J OLSON; *(Pacific Northwest)*: J L AYRES; *(Pacific Southwest)*: P F NOONAN

TREASURER EMERITUS

WILLIAM R MOORHOUSE
PO Box 352, South Yarmouth, Mass

CHAIRMEN, COMMITTEES OF THE COUNCIL

STANDING COMMITTEES—	
Executive Committee of Council	WELDON G HELMUS
Executive Committee on Research	CHARLES A SYLVESTER
Technical Committee on Research	GEORGE S WHAM
Publicity	EDWARD ARTIM
Appropriations	THOMAS R SMITH
Membership and Local Sections	W GEORGE PARKS
Publications	PAUL J LUCK
Corporate Membership	C T ANDERSON
Constitution and Bylaws	WILLIAM A HOLST
Conventions	E MORRILL
Technical Program	S G TURNBULL JR
Technical Supplies	GEORGE P PAINE
Archives	SIDNEY M EDELSTEIN
Intersociety Relations	ALBERT E JOHNSON
Textile Education	LEONARD SMITH
Subject and Speakers' Bureau	MATTHEW J BABEY
SPECIAL COMMITTEES—	
Intersectional Contest	THOMAS J GILLICK JR
Employee Retirement and Pension	WALTER J HAMBURGER
Harold C Chapin Award	DONALD W ROBINSON
Study Committee on Intersectional Contest	THOMAS J GILLICK JR
Study Committee on Endowment Fund	P J WOOD
Committee on Individual Membership	H A STAUDERMAN
Study Committee on Location of National Headquarters	SYDNEY M CONE JR
Student Award	JOSEPH LINDSAY JR
Olney Medal	E W LAWRENCE
American Dyestuff Reporter Award	CARL Z DRAVES

NATIONAL HEADQUARTERS

SENIOR STAFF	
Executive Secretary	GEORGE P PAINE
Director of Research	HAROLD W STIEGLER
Tech Manager-Research Associate	GEORGE J MANDIKOS
Staff Editor-Research Associate	G ROBERT THOMPSON
Research Associate	GLEN M KIDDER

LOCAL SECTION OFFICERS

New England Region

NORTHERN NEW ENGLAND ..... *Chairman:* ROBERT D ROBINSON, Bachmann-Uxbridge Worsted Corp, Uxbridge, Mass; *Secretary:* JOSEPH S PANTO, Fabric Research Labs Inc, 1000 Providence Highway, Dedham, Mass; *Vice Chairman:* EDWARD J McNAMARA; *Treasurer:* WILLIAM W PENNOCK

RHODE ISLAND ..... *Chairman:* ROBERT H PHILLIPS, Cranston Print Works Co, Cranston, R I; *Secretary:* RICHARD V DUGDALE, Rohm & Haas Co, 1226 Industrial Trust Bldg, Providence 3, RI; *Vice Chairman:* JOHN J ROARKE; *Treasurer:* HAROLD B STURTEVANT

WESTERN NEW ENGLAND ..... *Chairman:* ALBERT H RANT, Laurel Soap Mfg Co, 206 Calla St, Providence 6, RI; *Secretary:* HENRY C SPEEL, Schwarz, Speel & Associates, PO Box 53, Darien, Conn; *Vice Chairman:* TIMOTHY J HORAN; *Treasurer:* MURRAY N LEFKOWITZ

Central Atlantic Region

DELAWARE VALLEY ..... *Chairman:* CLARENCE A SEIBERT, Scholler Bros, Inc, Collins & Westmoreland Sts, Philadelphia 34, Pa; *Secretary:* ERNST W EMPTING, Verona Dyestuffs, 351 Lancaster Ave, Haverford, Pa; *Vice Chairman:* EDWARD G HAACK; *Treasurer:* CHARLES N KUZMA JR

HUDSON MOHAWK ..... *Chairman:* FLOYD J SZUREK, Mohasco Industries, Inc, Amsterdam, NY; *Secretary:* ARMAND DI MEO, Rebel Dyeing Corp, Gloversville, NY; *Vice Chairman:* ACHILLES S MAFILIOS; *Treasurer:* WALTER DRAUTZ

METROPOLITAN ..... *Chairman:* JOHN A KOMNINOS, Waldrich Company, River Rd, Delawanna, NJ; *Secretary:* RICHARD P MONSAERT JR, American Felt Co, 350 Fifth Ave, New York, NY; *Vice Chairman:* PERCY J FYNN; *Treasurer:* EUGENE J GRADY

NIAGARA FRONTIER ..... *Chairman:* KENNETH A LISTER, Canadian Industries, Ltd, Hamilton, Ont, Canada; *Secretary:* EARL R EAKINS, Monarch Knitting Co, Ltd, Dunnville, Ont, Canada; *Vice Chairman:* ANTON M VIDITZ-WARD; *Treasurer:* JOSEPH D NOONAN

Southern Region

PIEDMONT ..... *Chairman:* LINTON C REYNOLDS, Riegel Textile Corp, Ware Shoals, SC; *Secretary:* RICHARD E RETTEW, Polymer Southern, Box 2184, Greenville, SC; *Vice Chairman:* V B WRIGHT JR; *Treasurer:* R L WARD

SOUTH CENTRAL ..... *Chairman:* EDWIN F JURCZAK, Burkart-Schier Chemical Co, Chattanooga, Tenn; *Secretary:* LOWELL SHIVE, Arnold, Hoffman & Co, Inc, Chattanooga, Tenn; *Vice Chairman:* R J TYRRELL; *Treasurer:* W J WELBORN

SOUTHEASTERN ..... *Chairman:* ROBERT B HALLOWELL, Coats & Clark, Inc, Old Cordele Rd, Albany, Ga; *Secretary:* WARREN E TILLER, Tennessee Corp, 617-29 Grant Bldg, Atlanta 1, Ga; *Vice Chairman:* WILLIAM B AMOS; *Treasurer:* LEON TIGLER

WASHINGTON ..... *Chairman:* NELSON F GETCHELL, National Cotton Council of America, 1200 18th St NW, Ring Bldg, Rm 502, Washington 6, DC; *Secretary:* FLORENCE H FORZIATI, National Bureau of Standards, Textiles Section, Washington 25, DC; *Vice Chairman:* ROBERT T GRAHAM; *Treasurer:* EDMUND M BURAS JR

Western Region

MID-WEST ..... *Chairman:* JAMES L McGOWAN, Morgan Dyeing & Bleaching Co, Rochelle, Ill; *Secretary:* ARTHUR J ANDREWS, Keystone Aniline & Chemical Co, 321 North Loomis St, Chicago 7, Ill; *Vice Chairman:* FRANK S STOVER; *Treasurer:* JAMES E MILLER

PACIFIC NORTHWEST ..... *Chairman:* ROBERT C PICKENS, Portland Woolen Mills, 6639 N Baltimore Ave, Portland, Ore; *Secretary:* DANNY GAYMAN, Ciba Co, Inc, 1238 NW Glisan St, Portland, Ore; *Vice Chairman:* HUBERT N SHEA; *Treasurer:* DALE W KIMSEY

PACIFIC SOUTHWEST ..... *Chairman:* WALTER E KRAMER, Jenkins Wright Co, Inc, 2912 S Central Ave, Los Angeles 11, Calif; *Secretary:* RICHARD C DEMUTH, Dye Masters, Inc, 1511 W Florence Ave, Inglewood 3, Calif; *Vice Chairman:* ANGUS H ROBERTS; *Treasurer:* DAVID D SANDERS

STUDENT CHAPTERS

Auburn University, Bradford Durfee College of Technology, Clemson College, Georgia Institute of Technology, Lowell Technological Institute, New Bedford Institute of Technology, North Carolina State College, Philadelphia Textile Institute, Rhode Island School of Design

MARCH MORCEAU
1960

Inter Alia—Inter Nos

P J WOOD

JIGGERS

Some time ago we wrote for a few reprints of an article which had appeared in the Journal of the Society of Dyers & Colourists in December 1957, "The Watering of Acetate Poult Fabrics, Cause and Prevention", by E France of the Textile Research Laboratory of the celebrated English firm of fiber and fabric manufacturers of viscose, acetate and other synthetics, Courtaulds Ltd. Recently the reprints came to hand. A printing strike was responsible for the delay, says Mr France. So now, as long as they last, we will be glad to send a copy to anyone requesting one.

Maybe it would be just as well to do a spot of interpreting. Firstly, the expression "watering" means what we call "moireing", a common defect developing in ribbed fabrics scoured and dyed open width on the jigger, or jig, if you prefer that name. Poult fabrics, we take it, are ribbed fabrics like a poplin or a faille, which, as every jig dyer knows, are very prone to "moire" during dyeing.

Our own pet method of avoiding the development of this objectionable defect was to avoid tension during all operations prior to, during and after the dyeing process. Of course, precautions should be taken to prevent "telescoping" of the roll of goods. We took off all the conventional grooved pulley jigger brakes and replaced them with wooden "block brakes", the sort commonly used in the dry process part of the finishing procedures, beaming, tentering, calendering etc. These can be regulated to a hair-trigger braking power that is practically tensionless, with a little practice.

Another added expense that we found worthwhile was to tenter the goods before putting them through any wet operation. This gives a firmer and more uniform roll with perfectly parallel selvages, thereby eliminating unevenly dyed edges.

LESE MAJESTE

In the December issue containing INTER ALIA, we made the statement that the Princess Royal, to whom we should have referred as HRH The Princess Royal, "served as Chancellor of Leeds University for a time."

This brought swift retribution in the shape of a very nice letter from John Barritt, chief scientific officer of the Wool Industries Research Association, in which he says "if I interpret your comment correctly it does suggest that The Princess Royal is not now Chancellor of Leeds University; as a matter of fact she is very much the Chancellor. To give you an item of textile interest, the Second Quinquennial Wool Textile Conference on Fibre Science meets in Harrogate (England) from 18th - 28th May, and among other items there will be a visit and luncheon at the University at which HRH The Princess Royal will receive the members of the Conference."

The easy way is rarely the right way. A little while ago, our friend, C L Bird, he who wrote "The Theory and Practice of Wool Dyeing", sent us a copy of the report of the Clothworkers Department of Leeds University. If we had looked this up, we would have had our item 100% correct. Anyway, this will give us an opportunity to publicly thank Mr Bird for his kind thought in sending us this interesting report.

CON SUMMA LAUDE

Alexander Robert Urquhart, whom many of us met at the Harvard Club on the occasion of his last visit to this country, received the Institute Service Medal at the Convocation of the Textile Institute on November 3rd of the past year. Our own William H Cady was presented with the Scroll of Honorary Membership of the Society of Dyers & Colourists for his services as co-ordinator in the U S for the Colour Index. Two good men who never sound their own horns. We hereby blow both of their horns with lots of pleasure. A good picture of Bill Cady appeared in the January number of the Journal of SDC. In the same number is an obituary on Fred Smith, a Fellow and former president of the Society, who started his education at the Leeds Grammar School and was later a student at the University in some of the classes of this scribe. One of his favorite sayings was "if you want owt from life, you must put summat in." And we know from personal contact that Fred really did put something into life.

AGE

"Growing old is not so bad, when one stops to consider the alternative."
- Mason-Dixon in Southern Textile News

FROM OUR COLLEAGUES, ADVISERS AND BACKERS FROM HERE AND THERE

In reply to our inquiry as to how he is enjoying the days of leisure since his retirement from Brotherton & Co, Fred Heath, after a lifetime there, writes that he is taking an occasional holiday in Bridlington, the ancient name for which East Yorkshire coast town was Burlington Quay, pronounced "Kway" by some of the older inhabitants. For the rest, says he "There is plenty to do without business--gardening, taking out the dog, acting as chauffeur for the wife's shopping expeditions, reading, which, in these days of TV seems to be a dying pastime, 'washing up' and making myself useful - very often by keeping out of the way." So now you fellows who have been yearning for retirement days know what to expect.

In a letter recently, Richard J Smith of the publicity department of Imperial Chemical Industries, which publishes that interesting and informative Hexagon Digest, reveals that he also is an "Old Moderner". He refers to the Modern School as West Leeds, where it now is; in the days when we wrote our name 100 times, occasionally, for good and sufficient cause, it was down in the center of the city. But that ancient building was bombed in one of the World Wars and the new school was re-erected in a more salubrious neighborhood. Of the three private schools in Leeds, the Grammar School, the Middle Class and the Modern, we venture to say that the Modern made a greater contribution to the ranks of the athletes at the University than either of the other two. Richard said he was expecting to see Julian S Jacobs on that trip to Europe he was planning.

Another "Old Moderner", A E Wood, writes us correcting our geography of Yorkshire. From him we learn that we omitted one important tributary, the Don, which runs through Doncaster, where several important horseracing events have taken place since time immemorial. He also takes issue with us on the inclusion of the Trent as a Yorkshire river. Says he, "Agreed it debouches into the Humber adjacent to the river Ouse - Yorkshire's main river, which is greatly exceeded in length by its own tributary the Ure. The Trent is England's third river (170 miles) being exceeded by the Thames (209 miles) and the Severn (210 miles). It flows through Cheshire, Staffordshire, Derbyshire, Nottinghamshire and Lincolnshire." Thank you, we stand corrected.

Our thanks are due to Fred Wood of the British Rayon Research Association; "Mique" Flett of New London, NH; Gordon Bednall, editor of the Dyer, London, England; and C M Whittaker of Scarboro, where he is living in retirement these days, all of whom sent greetings recently. Oh yes, and Harry Thomas, who seems to have had another promotion since he last wrote. Dr Thomas was chief of the department of development at Courtaulds.

OBSCURE KNOWLEDGE

Says that well-informed and on-its-toes publication, Changing Times, "Man now knows what's on the other side of the moon but still can't tell what's in the back of his wife's head." And, a bit further on, "He can fly faster than sound, but can't walk up a flight of stairs without puffing."

THE ROOT OF ALL EVIL

"Money buys everything except love, personality, freedom, immortality."
- Wisdom

ACCOLADE

On the first day of this present year, Jerry Shields wrote a well-deserved pat-on-the-back regarding a distinguished Rotarian, Charles H Stone, in the Charlotte News. Evidently Charlie Stone carried out his duties as a member of this well-known international organization in the same faithful way that he has done in any other activity he ever took up, including his membership in AATCC.

It seems that the first of the year saw completed 25 years membership in Rotary in which our friend never missed a meeting in all those years. He served as governor of District 183 covering Western North Carolina. Like many another AATCC member that we could mention, and will some day, if we are spared, Charlie has not been lacking in rendering public service in his growing city, having been chairman of the Park Commission from 1941-1946; another influence he exercised for the public good was the adoption of the city manager system in Charlotte. Hail "Mr Rotary" of Charlotte.

In a recent letter, he mentions having worked for Farbenfabriken of Elberfeld Company in 1904 under Charles C Young and Jack W Turvey, in the New York office, and in the Boston office in 1907, where he was associated with Carl Waldinger, R Hutz and John O'Day, whom we have seen within the last few years. Another member of that organization Charlie does not name was Paul Knobbe. We knew him both in New York and later in the Garfield Aniline Company.--QEF

News of the Trade

Conference on Fiber Blends

New developments in the blending and combining of different yarns and fibers will be presented at a conference to be held May 17-18 at the Quartermaster Research and Engineering Command, Natick, Mass. Sponsor of the "Conference on Fiber Blends and Combinations and Their Impact on Military Textile Applications" is the Committee on Textile Fabrics of the National Academy of Sciences—National Research Council's Advisory Board on Quartermaster Research and Development. Conference chairman will be J B Goldberg, a member of the sponsoring committee and a consultant to the textile and allied industries.

According to Mr Goldberg, the principle objective of the conference will be to stimulate the kind of imaginative research that will lead to the development of new fabrics for both military and civilian needs.

About ten papers will be presented during the two morning and two afternoon sessions by leading scientists and technologists from industry, government, and private research organizations. Topics will cover various aspects of intimate blending, combining yarns of different fiber, aesthetic properties and serviceability, and application of blends to military uses. Allowance will be made for discussion periods following each presentation.

Registration will be free and open to anyone associated with the textile industry or with organizations conducting textile research. Further information may be obtained from W George Parks, Dept of Chemistry, Univ of Rhode Island, Kingston, RI.

•

SNC Announces $2 Million Expansion

Solar Nitrogen Chemicals, Inc has undertaken a two-million dollar expansion of the ammonia, urea, nitric acid, and nitrate facilities at its Lima, O, plant. This expansion, which reportedly will result in an annual increase in ammonia production of approximately 25,000 tons per year is moving ahead rapidly and completion is anticipated during 1960.

The company's products are sold by the Sohio Chemical Co, its manufacturing and sales agent.

Solar Nitrogen Chemicals, Inc is jointly owned by the Atlas Powder Co, Wilmington, Del, and The Standard Oil Company of Ohio.

Leslie

Prominent Speakers to Take 'A Look at the 1960's' at Textile Seminar During ATMA Show

Frank Leslie, vice-president of Burlington Industries, Inc, will be the luncheon speaker winding up the "Look At The 1960's" seminar sponsored by Werner Textile Consultants on May 25, on the occasion of the American Textile Machinery Exhibition in Atlantic City, NJ.

Four prominent panelists will discuss economic, financial, technological and marketing developments and implications for the textile industry in the 1960's at the seminar beginning at 9:30 AM.

William H Miernyk, director, Bureau of Business and Economic Research, Northeastern Univ, will present a paper on "The Economic Outlook for Textiles," followed by Walter Regnery, vice president, Joanna Cotton Mills, who will speak on "Vistas of Textile Technology."

Walter A Kelly, president, commercial Factors Corp, will discuss "Financing Equipment Modernization," and C W Bendigo, director of marketing, Werner Textile Consultants, will talk on "A Marketing Man's Outlook Toward Machine Modernization."

The seminar will conclude at 12:00 noon, followed by a reception and lunch. The subject for Mr Leslie's address will be "The Textile Merchant Then and Now." Both the seminar and lunch will take place at the Shelburne Hotel, Atlantic City, NJ.

•

Ontario Section, CATCC Celebrates Silver Anniversary

"In the past 25 years, the science of making textiles has advanced more than during the previous two centuries," according to a statement by George H Dobbie, chairman of the Primary Textile Institute, made February 6 in Hamilton, Ontario, at the Silver Anniversary dinner of the Ontario Section of the Canadian Association of Textile Colourists and Chemists.

"They were in the right place, with the right thoughts, at the right time, and all of Canada has since benefited," Mr Dobbie said in tribute to the men who founded the CATCC in Hamilton in 1935.

"Best way to measure developments in textile manufacturing during the past quarter century was in advantages to the consumer. They are better dressed, and their homes better equipped, than ever before," he said, pointing to improved color and texture as "real new appeal, in textiles" and to the processes that protect against weather, moths, rot and creasing.

"The range and uses of fabric have been expanded to staggering proportions, and easy-care is more than an advertising catch-phrase."

Prior to the address by the Canadian textile industry's chief executive, the gathering was accorded a civic welcome by the City of Hamilton, tribute was paid to surviving charter members and past presidents of the CATCC and special awards were made to many.

History of the textile technological association movement in Canada, from the first meeting of 19 men 25 years ago to today's eight groups with a total membership of 1200, and coordinated by the Textile Technical Federation of Canada, was traced by several speakers.

Mr Dobbie, who is president of Newlands and Co Ltd, Galt, Ont, said technologists were no longer "back-room boys", but were taking an increasingly active part in the direction of the industry. "That is the way it should be, for today technology is management more than ever before."

"Technologists should also take pride in the fact that the Canadian textile industry is everywhere recognized as operated at peak efficiency," he said. "There have been nine testimonials to industry efficiency published outside the industry during the past five years."

Management and shareholders had spent $513 million of new capital, mostly for new machinery, plus $284 million for repairs and maintenance, during the past decade, Mr Dobbie explained. "Sometimes this was at very great sacrifice during a trying

period, and the money would not have been forthcoming had there not been confidence that the new machinery and equipment would be intelligently used."

He said that future of the Canadian textile industry depended on "the determined efforts of all of us" meeting the challenges of foreign producers to make further inroads into the rapidly growing Canadian market. "Our struggle for survival which will not become easier, will rest, to a large degree, on our own ability to maintain top efficiency and on the respect we can maintain with the people of Canada and their elected representatives."

•

Hindle

Consultant Organizes Company

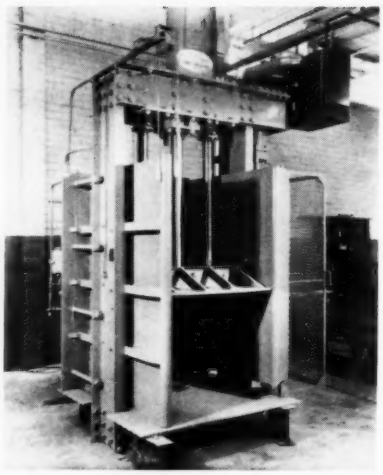
Walter H Hindle, market development consultant, has announced the formation of a consulting company to serve the chemical and textile industries.

The new company, Walter H Hindle, Inc, includes specialists in the field of fiber development. Consulting services range from raw materials for synthetic fiber manufacture to the development of textile markets.

The company has been retained by Air Reduction Co as consultants on the development of vinal polyalcohol fiber. Mr Hindle, president of the consulting organization, has been active for the past year in the technical and market evaluations of vinal conducted by Air Reduction.

Author of many patents in the textile and allied fields, Walter H Hindle was formerly associate director of research and development for the Chemstrand Corporation, where he directed studies on Acrilan and Chemstrand nylon. Earlier he served with Burlington Industries, directing research and development on the dyeing and finishing of synthetic fibers. He also worked on fiber applications and development for the Celanese Corporation of America. Hindle is a fellow of the Textile Institute and the author of many papers on fiber technology.

Offices of Walter H Hindle, Inc, are located at 420 East 55th Street, New York 22, NY.



A custom automatic bagged pigment press manufactured for E I duPont de Nemours & Co, Inc, Wilmington, Del. Other presses are scheduled for delivery by James Hunter, Inc to Monroe Cotton Mills, Monroe, Ga; Bladenboro Cotton Mills, Bladenboro, NC; Chemstrand Corp, Greenwood, SC; and Strong-Hewat & Co, North Adams, Mass.

James Hunter, Inc Acquires J T Beaty Machine Co

James Hunter, Inc, Mauldin, SC, has announced the delivery of the first Beaty hydraulic press manufactured by the company since it recent acquisition of the J T Beaty Machine Company of Charlotte, NC. This southern subsidiary of the James Hunter Machine Company, also produces a complete line of textile fiber feeding and blending machines, flex spools, expanders and cloth handling equipment.

Hydraulic baling presses for a broad range of uses by the textile and other industries will be manufactured in the large, new plant recently built by James Hunter, Inc in Mauldin. Various models include standard and drawbar cloth presses, up-packing and down-packing waste presses, both single and double box, and custom presses for special applications.

In addition to manufacturing the equipment formerly produced by the J T Beaty Machine Company, James Hunter, Inc will maintain parts and service facilities for Beaty equipment presently in service in plants throughout the country.

•

PTI Textile Career Conference

Eighty-five guidance counselors and schoolmen attended the recent Textile Career Conference sponsored by the Philadelphia Textile Institute.

A David Preston, manager of personnel engineering, The Chemstrand Corp, Decatur, Ala, was the principal speaker. In addition, a panel of five members from various segments of the textile industry participated: Stanley Elkins, president, Crestwood Textile Corp, New York, NY; Robert P Kirchner, assistant stylist, J P Stevens & Co, Inc, New York, NY; Robert J Kirkpatrick, research engineer, Textile Research Laboratories, E I duPont de Nemours & Co, Inc, Wilmington, Del; Robert L Morgan, technical director, Hess, Goldsmith & Co, Inc, Division of Burlington Industries, Wilkes-Barre, Pa; and Ralph Stanziola, chemist, technical service, American Cyanamid Co, Bound Brook, NJ. These representatives were interrogated by a panel of guidance counselors. Also, questions from the audience were answered.

Purpose of the conference was to acquaint the local area schools with the opportunities available in the textile industry. Representatives came from Pennsylvania, New Jersey, Maryland, Delaware, and New York.

Future Papers

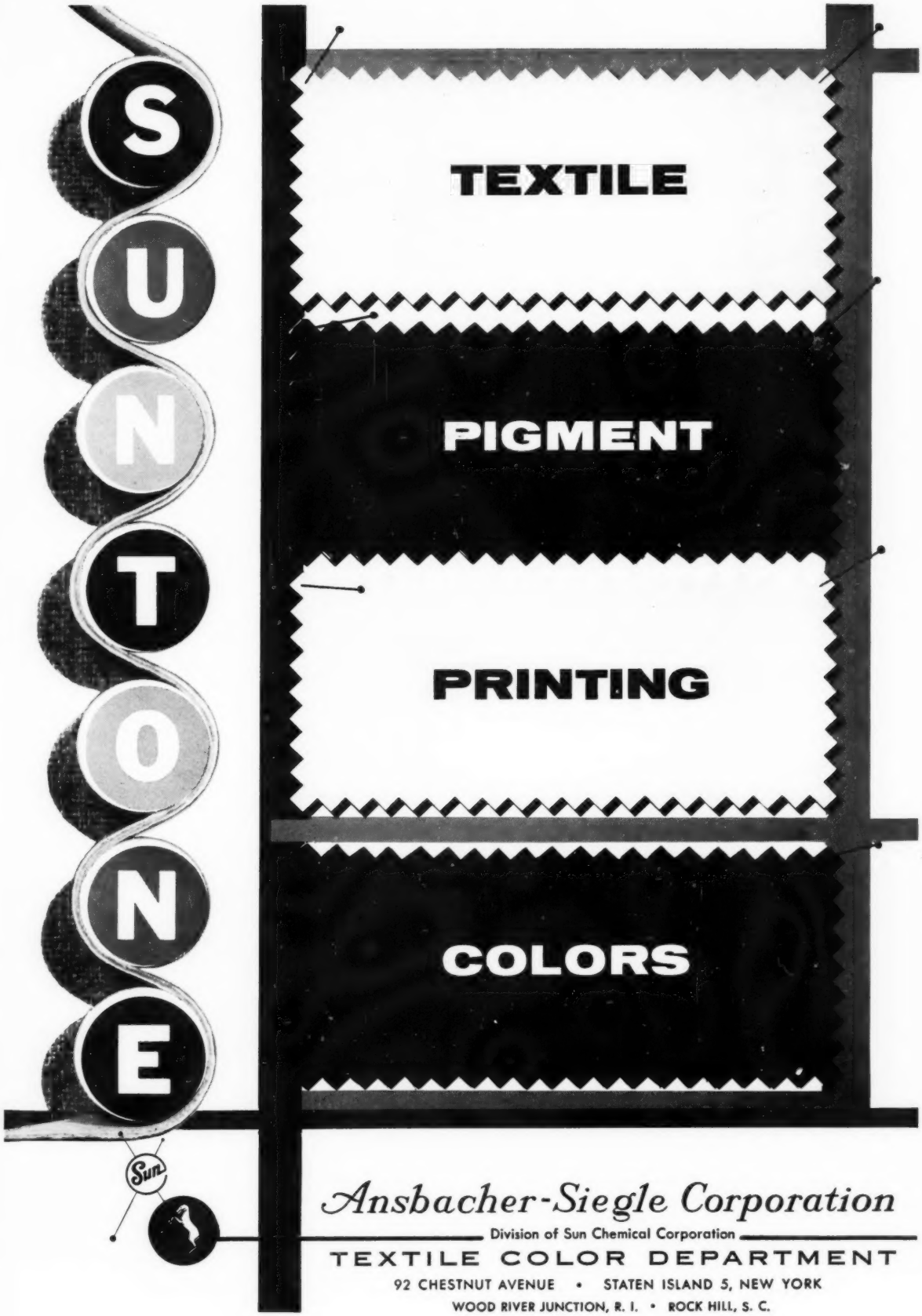
THE following papers, other than *Proceedings of the American Association of Textile Chemists and Colorists,* have been accepted for publication in future issues of *American Dyestuff Reporter:*

"Infrared Spectra of Cellulose Modifications"—Robert T O'Connor, Elizabeth R McCall, and Donald Mitcham, Southern Regional Research Laboratory, USDA

"An Approach to Automation of a Wrinkle Recovery Tester"—Julia M Sloan, Chester H Haydel, E Fred Schultz Jr, and Heber W Weller Jr, Southern Regional Research Laboratory, USDA

"The Effects of Gamma Radiation on Cotton Cellulose"—Jett C Arthur Jr, Florine A Blouin, and Robert J Demint, Southern Regional Research Laboratory, USDA.

"Pathways of Capillary Migration of Liquids in Textile Assemblies"—Francis W Minor and Anthony M Schwartz, Harris Research Laboratories; Lawrence C Buckles and E A Wulkow, U S Army Chemical Warfare Laboratories.


SUNTONE
TEXTILE
PIGMENT
PRINTING
COLORS
Sun
Ansbacher-Siegle Corporation
Division of Sun Chemical Corporation
TEXTILE COLOR DEPARTMENT
92 CHESTNUT AVENUE • STATEN ISLAND 5, NEW YORK
WOOD RIVER JUNCTION, R. I. • ROCK HILL, S. C.

• NAMES IN THE NEWS •

Peterson

Charles F Peterson has joined the Dewey and Almy Chemical Div, W R Grace & Co, as manager of organic chemicals, Western Division.

Peterson, who will make his headquarters in Los Angeles, served previously with the Carrier Corp.

He will be in charge of sales of Dewey and Almy's vinyl acetate polymers and copolymers, butadiene styrene latices, plasticizers, and dispersing agents.

•

Andrew K Forthmann, president of the Los Angeles Soap Company, has been re-elected to his third term as president of the Association of American Soap & Glycerine Producers, Inc.

Five new directors also were chosen and the remainder of the slate was re-elected at the closing session of the trade group's thirty-third annual convention in the Waldorf-Astoria Hotel.

More than eight hundred executives and representatives of the soap and detergent industry and allied fields took part in the three-day meetings, January 20 to 22.

New members of the fifteen-member board of directors are *E H Farnham,* Dow Chemical Co, Midland, Mich; *Kenneth Fulton,* Beach Soap Co, Lawrence, Mass; *A B Hersberger,* Atlantic Refining Co, Philadelphia, Pa; *F G Meeker,* Andrew Jergens Co, Cincinnati, O; and *Howard Young,* The Davies-Young Soap Co, Dayton, O.

The board of directors reelected *R A Hart,* Colgate-Palmolive Co, New York, as Association vice president for the East; *A W Schubert,* Emery Industries, Inc, Cincinnati, vice president for the Mid-West; *A C Pelletier,* Purex Corp, South Gate, Calif, vice president for the West.

Also, *N S Dahl,* John T Stanley Co, New York, treasurer; *M A McManus,* Lever Brothers Co, New York, assistant treasurer; and *Roy W Peet,* secretary of the Association, New York.

Drummond

The Franklin Process Company, a division of Indian Head Mills, Inc, has announced that *Byron Drummond,* who has been with the company for eleven years, will cover metropolitan New York and Brooklyn, replacing *Arnold Dana,* who has resigned.

Mr Drummond, who started as a dyer with Franklin Process in 1949, was formerly production manager of the Providence, RI, plant. When this plant closed, he was transferred to Philadelphia and given the sales responsibilities for Northern Pennsylvania, New York State, New Jersey, Delaware and Maryland.

•

Three appointments to positions in the newly created Corporate Development Department of General Aniline & Film Corporation were announced January 19.

The appointments were *F A Hessel* as manager of commercial research; *W W Williams,* manager of foreign liaison; and *J M Moran* as senior development specialist.

The new Development Department was established to assist the Corporation's Management Committee and the president of the Corporation in the operations of the Company.

Dr Hessel had been commercial research manager of the Commercial Development Department of the Dyestuff & Chemical Division since 1953.

Dr Williams was formerly foreign technical representative for the Dyestuff & Chemical Division.

Miss Moran was formerly supervisor, technical service in the Dyestuff & Chemical Division's Commercial Development Department.

•

R F Fischer, a research supervisor at Shell Development Company's Emeryville Research Center, became technical assistant for chemicals to *H Gershinowitz,* president of Shell Development Company, in New York on March 1. The assignment will be for two years. While in New York, he will also work on chemical licensing problems.

Lindberg

Joel Lindberg, assistant director of the Swedish Institute for Textile Research in Gothenberg, Sweden, will join the Textile Research Center of the school of Textiles at North Carolina State College on July 1.

Dr Lindberg will remain at Raleigh for at least two years, with the possibility that he will remain in the U S permanently. While at State College, he will be engaged in the development of Textile Research Center's new and broadened program of basic textile research.

Dr Lindberg is a textile scientist of international repute who is well known in textile research circles in the U S. His most recent visit took place last summer at which time he delivered a paper at the Gordon Research Conferences.

•

Robert Hyndman and *Wayne Micheel* have been named product managers by Morton Chemical Co, Chicago, Ill. Mr Hyndman will be responsible for inorganic chemicals, while Mr Micheel will work with inorganic chemicals.

As product managers, Hyndman and Micheel will coordinate production, research, and sales, and will participate in planning and developing new products.

Mr Hyndman has been with Modton Chemical since 1954. Mr Micheel joined the company in 1957.

•

Herbert L Werner, senior partner of Werner Textile Consultants, New York, sailed aboard the S S Constitution Feb 27 accompanied by Mrs Werner on a business trip to Italy where he will discuss the new industrial development program.

He will confer with industrialists, bankers, and government officials on the feasibility of establishing plants by American textile companies whose output will be geared to the European Common Market.

Mr Werner's organization is the largest management consulting firm specialized in servicing the textile industry.

Carpenter

T Bell

R M Bell

Miller

Polymer Southern, a Division of Polymer Industries, Inc, Greenville, SC, has announced that *Jack B Carpenter Jr* has joined its sales staff as technical sales representative.

Mr Carpenter was previously with Burlington Industries where he served as chief chemist in the Synthetics Division.

His headquarters will be Polymer Southern's offices in Greenville. He will represent Polymer Southern throughout the states of Virginia and North Carolina.

•

Roy H Boggs has been named textile section leader in the Market Development Section of A E Staley Mfg Co.

Mr Boggs was a chemist with UBS Chemical Co, Cambridge, Mass, when it was acquired by Staley's and had been a technical supervisor of industrial sales since.

•

Fabric Research Laboratories, Inc, Dedham, Mass, has announced four additions to the research staff. *T David Higgins* has been appointed a senior research associate and *Byung Sook A Kim*, *Elizabeth W Snell*, and *Chrisoula Fillis* have been named research assistants.

Since 1956 Mr Higgins has been a textile technologist with Union Carbide Chemicals Co, So Charleston, W Va. His specialty is the physical variables involved in synthetic fiber spinning and at FRL he will be involved in new fiber development work.

Mrs Kim is a recent graduate of Lowell Technological Institute.

Mrs Snell previously worked as a chemist for the Quartermaster Office in Philadelphia.

Miss Fillis is undertaking her first professional assignment.

•

Charles H McBurney has been appointed director of research of Rohm & Haas Co, effective March 1. The position was previously held by *Ralph Connor*, who continues as vice president in charge of research and chairman of the board. Dr McBurney has served as assistant director of research for the past ten years.

F T Bell

Klauder Weldon Giles Machine Co, Philadelphia, manufacturers of textile dyeing and finishing equipment, has announced election of new officers following its January board of directors meeting: *John M Giles*, president; *Thomas Bell*, vice president, secretary, and general manager; *Robert M Bell*, vice president in charge of sales; *Frederick T Bell*, vice president in charge of purchases; and *Doris L Giles*, treasurer.

John M Giles succeeds *William E H Bell*, who had been president of the Company for many years prior to his death in 1959.

The active management of the company is being carried on by Thomas Bell, Frederick T Bell, and Robert M Bell.

•

Kenneth L Sayre has joined Bjorksten Research Laboratories, Madison, Wis, as senior project leader in the Organic and Plastics Division. Mr Sayre was previously with the Laboratories from 1950 to 1953. For the last six years he has been employed by B F Goodrich Chemical Co in Avon Lake, O, where he specialized in high polymer chemistry for plastic and textile applications.

•

Anton Viditz-Ward has joined the technical service staff of Allied Chemical's National Aniline Division as technical service specialist—textile dyes.

Mr Viditz-Ward will operate out of National Aniline's new technical service headquarters at Buffalo, NY. Before joining National Aniline, he was director of research development at Van Raalte and has held responsible positions at Pepperell Mfg Co and Burlington Mills.

Century Chemical Corp has announced the appointment of *Herbert R Miller* as vice president of its recently formed International Division, and *Steve Howarth* as plant manager of Wilson Organic Chemicals Inc, Sayreville, NJ, a recently acquired subsidiary.

Mr Miller's new post will encompass the administrative direction of the International Division, responsive to and integrated with the overall programming of the parent company. Prior to joining Century, he served Mathieson Chemical Corp and Olin Mathieson Chemical Corp in a variety of positions over a period of ten years.

Mr Howarth's new post will include production and personnel responsibilities. He has served Wilson in a number of key positions since 1948, including posts as president, secretary and treasurer.

•

Gerald P Robinson has been appointed manager of industrial fungicides for Nuodex Products Co, Division of Heyden Newport Chemical Corp. He will administer all product programs, including sales and technical service with the company's industrial fungicides prospects, and customers in the nonpaint industries.

Mr Robinson was formerly a sales representative with Lever Brothers Company in its Industrial Division.

•

M L Fillippeli Sr has joined the sales staff of Apex Chemical Co, Elizabeth, NJ. Mr Fillippeli was previously associated with Burlington Industries, Richmond Piece Dye Works and Arkansas Co, Inc. He will service Apex customers in the south from his home in Greensboro, NC.

•

Appointment of *Ted W Palmer* as product manager handling chelating agents has been announced by The Dow Chemical Co, Midland, Mich.

Mr Palmer will be responsible for the sales programing of Versene chelating agents and Separan flocculants. He joined Dow in 1957 and has been a technical salesman on Separan, Versene and Dowex ion exchange resins.

BLACKS
blacks
BLACKS
BLACKS
blacks
BLACKS
blacks
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS
BLACKS

..... ARIDYE and AQUAPRINT BLACKS of course!

THESE ARE THE STANDARDS FOR PIGMENT PRINTING

All are noted for their deep-black shades,
trouble-free runnability, and excellent all-round fastness

ARIDYE BLACKS K and 2K are preferred by leading printers for application by the w/o emulsion system; the choice depends on the jetness of shade desired.

AQUAPRINT BLACK K is most popular for machine and screen printing by the o/w emulsion system.

AQUAPRINT SUPRA BLACK K used in conjunction with Aquaprint Supra Clear and Reactor provides extraordinary fastness to repeated washing and drycleaning.

Whether you're printing cottons, synthetics, or blends, there is an ARIDYE or AQUAPRINT BLACK that best fits your needs. They have proved outstanding for printing objects, fine lines, and for overprinting dyed grounds on curtain and drapery fabrics, dress goods, and tablecloths.

For samples and full information on any or all these colors, simply write or phone the Color & Chemicals Division office nearest you.

Aridye® COLORS

Aquaprint® COLORS

Interchemical CORPORATION · *Color & Chemicals Division*

Pawtucket, R.I. • HAWTHORNE, N.J. • Rock Hill, S.C.

Abstracts

(*concluded from page 33*)

to give light practically equivalent to daylight or to daylight transmitted by window glass. Present knowledge indicates that the optimum temperature in the Xenotest lamp exposures, ie, for maximum correlation with daylight exposures, is between 120° and 170°F. However, the maximum effective humidity in the two lamps, even with the wet wicks and jets, is still too low; the author states that, to duplicate daylight exposure conditions in the UK, lamps should be operated at an effective humidity of 20%.

Seven references to the literature are cited.

•

The Mechanism of Resin Deposition in Cotton

Rath, H, Herbolsheimer, E and Stapf, S, *Textile Bull 85*, 64, Nov, 1959

The authors state that, in the process of imparting crease and swelling resistance to fibers by deposition of resin, it has been believed necessary to remove the excess precondensate from the spaces *between* the fibers by squeezing in order to attain the highest possible deposition *within* the fibers. The squeeze in padding was thought to have the function of "pressing in" the precondensate solution into the fiber interior.

The question arises, the authors say, whether during impregnation the fibers in a cotton fabric are actually capable of absorbing the required quantity of precondensate, and whether it is possible in the padding operation to squeeze out the entire liquid between the fibers and to retain only the solution which has penetrated within the fibers. They claim that the absorbing capacity of fibers cannot be increased by pressure, and that the concentration of precondensate within fibers can be increased only by diffusion due to some effects of the drying process, which cannot be influenced by pressure.

The authors point out that crease resistance can be obtained without pressing or squeezing, provided that the concentration of the resin precondensate solution is not unduly high. This can be done by *spraying* the resin solution on the fabric instead of *padding* it. One advantage of the spray application would be a saving in drying time and cost.

It is stated that the crease-recovery angle increases when a precondensate of up to 300 gpl of resin is used for spraying, but it falls off if the concentration of resin is higher. The hand of the fabric, the authors say, is the same whether the resin is sprayed or padded, but fabrics that were sprayed seemed to have a higher resistance to abrasion.

Fabrics weighing more than 12.6 oz/sq yd do not readily accept the spray method, but their absorbent properties can be increased by the use of humectants or by presteaming.

•

Chemical Fibers in the Soviet Union

Maistrenko, I V, *Ind Eng Chem 52*, 44A-48A, Feb, 1960

The Soviet Union's chemical fibers production is materially behind that of some of the other powers, ranking sixth in world lineup. Not surprising, then, is the special emphasis given in the Seven-Year Plan (1958-1965) to improve this situation. These plans call for a fourfold increase in total production (from 150,000 tons in 1957 to 650,000 in 1965), with synthetic fibers showing a 12-13-fold increase.

(It should be noted that in present Soviet nomenclature "synthetic" fibers are those developed from man-made polymers, while "artificial" fibers are those obtained by chemical treatment of natural substances, ie, cellulose.)

In 1950 viscose rayon constituted 84.5% of total fiber production in the USSR, while synthetic fibers accounted for only 7.2% and acetate 1.2%. With emphasis now on increased production of fibers from natural gas and by-products of coal and oil, it is expected that the percentage of the synthetic fibers will be more than tripled by 1965.

The author lists eight synthetic fibers now being produced or under development in the USSR: "Capron" and "Anide" (nylon-type), "Enant", "Lavsan" and "Nitron" (also polyamides), "Chlorin" obtained from perchlorovinyl resins), "Phtorlon" (Teflon-type, containing fluorine) and fibers of the polyethylene and polypropylene class.

The basic raw materials for the polyamide-type Enant and the fiber produced from it are ethylene and carbon tetrachloride, the author states. A so-called "ragged polymerization reaction (thermo-mercerization)" occurs, and by a number of chemical conversions amino-Enant acid is formed. This type is similar in composition to nylon.

The author comments that the major problems of the Soviet chemical industry are "poor product quality, shortage of raw materials, and too few chemists." He states that plant equipment is poor and often obsolete. Technicians are slow in learning how to use new machines, and time schedules are frequently violated. Furthermore, neither the USSR nor its satellites is able to satisfy internally the requirements for equipment to produce chemical fibers, which must be purchased abroad. This problem holds back th development of the industry, he says.

•

Corrosion Inhibitor for Chlorite Bleaching

Anon, *Dyer 122*, 609, Nov 6, 1959

Sodium chlorite readily attacks the containers and machines used for bleaching, and particularly those made of ordinary and stainless steel. This corrosive action of the chlorine dioxide liberated has retarded the development of the chlorite bleach in spite of the fact that its merits are well known.

It is pointed out that sodium chlorite is a very stable compound and requires activation in order to liberate its bleaching properties.

A new product, Omnifos N.1100, put on the market by the Omnifos department of the SEPR, a French company, makes possible, it is claimed, both the activation of the chlorite and inhibition of the corrosive action. It stabilizes the bath so that it can be kept for eight hours without decomposition, and it forms complex compounds so that rust or other iron salts in the solution cannot stain the textile material during drying and in storage.

Omnifos N.1100 buffers the chlorite solutions. During bleaching in the open vat at a pH of 4.5 the bath will retain its acidity throughout the treatment. Further additions of acid are therefore unnecessary. In open-width bleaching in a concentrated liquor of pH 3.5, stability of the latter is obtained throughout the operation.

Chlorine dioxide, which usually appears after 15 minutes when the bath is activated with formic acid, will not appear until after 75 mins when the bath is activated (and inhibited) with Omnifos, it is claimed. Bleaching time can be reduced, and the bleaching effect is greater.

The fiber becomes slightly swollen during the treatment; motes are oxidized and disappear. Dyeings are said to be more brilliant as a result of this treatment, and deeper shades are obtained.

Corrosion tests were made with stainless steel 18:8 containing molybdenum. Samples were immersed for five days in solutions of 3 gpl of chlorite with and without 3 gpl of Omnifos N.1100. The sample in the solution containing the inhibitor lost only one-fourth as much weight as the other, it is claimed.

METRO-ATLANTIC SOFTENERS

the most complete line of softeners for every textile use

NAPSOFT D

Anionic softener designed to produce a full lofty hand on napped goods.

ATCOSOFT S

Nonionic silicone softener producing the durable silicone wash-wear hand.

ATCO FINISH SRF

Exceptional soil resistant anionic softener.

ATCOSOFT S-100

Anionic softener for maintaining brighter colors.

ATCOSOFT PE

Nonionic polyethylene emulsion for increased tear and abrasion resistance.

soon to be released

REZSOFT NI

Nonionic reactant non-chlorine retentive versatile softener.

ATCOSOFT SD

Economical cationic softener for plain quality finishes.

D-STAT

Antistatic softeners, durable cationic, anionic, nonionic types.

REZSOFT CW

A highly substantive cationic softener for use with resins.

ATCOSOFT N

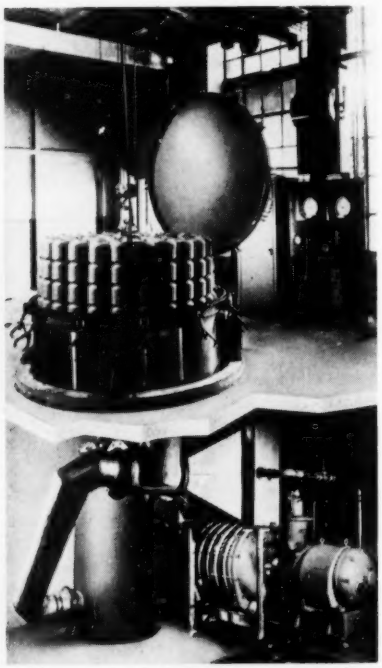
Economical anionic softener for plain quality finishes.

CHEMICALS (MA) DYESTUFFS

CALL YOUR **METRO-ATLANTIC** REPRESENTATIVE FOR DETAILED INFORMATION

"Technical bulletins are available upon request."

Main Office: CENTREDALE, R. I.; *Manufacturing Plants:* CENTREDALE, R. I., GREENVILLE, S. C.; *Offices, Service Laboratories, Warehouses:* CENTREDALE, R. I., GREENVILLE, S. C., BURLINGTON, N. C., HAWTHORNE, N. J.; *Foreign Branches:* GRANBY, QUEBEC, HAVANA, CUBA; *Sales Promotion Office:* 6 EAST 39TH ST., NEW YORK 16, N. Y.



New recirculating-type extractor-dryer for packaged yarns built by Turbo Machine Co. The basement installation, illustrated, fits a space only 11 x 11 feet square.

Recirculating-type Extractor-Dryer

The development of a new recirculating-type extractor-tdryer for packaged yarns has been announced by Turbo Machine Co, Lansdale, Pa.

It is stated that the new machine speeds up the extracting-drying operation, while requiring half the space, and costing 50% less than other recirculating-type machines. Four mill installations have been made, and other machines are being built.

Much of the success of the equipment is due to the simplicity of the design. The equipment reportedly can be installed rapidly at low cost, there is very little maintenance and no compressed air required, and there are no air-oil filters or conventional air filters.

The machine is said to have a silent-operating, non-overloading blower with automatic control of air supply temperature to the yarn, and an automatic temperature recorder for air exhaust from the yarn. It has a pressure gauge to show resistance to flow. Air flow directional control is either manual or automatic. The machine shuts off automatically at the end of each cycle.

The machine features a stainless-steel pressure-type kier with precision balanced cover. Power and service supply requirements are said to be low.

With the new machine, drying and extracting is a high-speed operation, Turbo reports. The exact processing time depends on many variables, such as type of tub, density of package, count of yarn, and class of colors or dyestuffs.

•

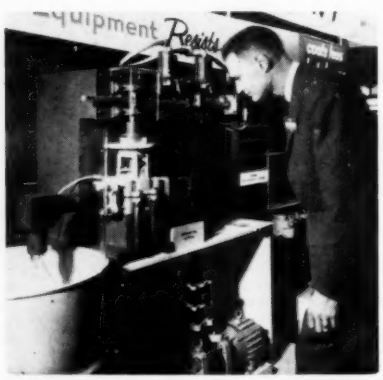
Cibacron Yellow G

Claimed to be "the most versatile reactive yellow on the market," Ciba Co Inc's latest addition to the Cibacron family reportedly builds up well in the exhaustion method and gives excellent yield in all pad applications as well as by the Thermofix method.

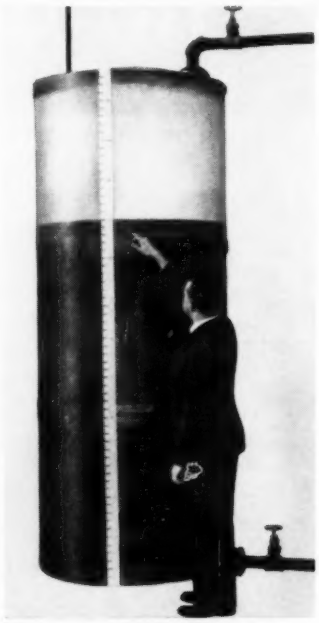
A complete range of "Kelly Greens" are said to be possible by combining Cibacron Yellow G and Cibacron Turquoise Blue G. These shades can be obtained by all methods of application, it is stated.

Cibacron Yellow G has all the properties associated with the Cibacron reactive dye family and is exceptionally fast to resins. It is reported suitable for printing and can be discharged to a pure white with neutral discharges. The new product is also recommended by Ciba for dyeing wool by the Neovadine method.

•



At the recent Exposition of Chemical Industries at the New York Coliseum, one of the eye-catching displays was this test rig putting a Karbate impervious graphite globe valve through its paces. An automatic recorder reportedly counted a total of 22,027 opening and closing operations during the 46 hours the show was open, for an average of some 440 operations an hour. The test equipment is the same used by National Carbon Co, Division of Union Carbide Corporaton, in full laboratory evaluation of the type G globe valve prior to its introduction last year. The device also features a Karbate impervious graphite pump, pipe, and fittings to illustrate the components available for handling corrosive solutions.



J & H Visible Level Tank

Visible Level Tank Gauge

A visible liquid-level gauge for reading inventory and controlling batching amounts is now available on J & H Reinforced Plastic Tanks. Liquid level is seen through the translucent tank walls and the volume read on a calibrated gauge running the height of the tank. Overfillings due to faulty readings are said to be eliminated. Tanks with gauges, suitable for any liquid including corrosives or distilled water, are available in standard sizes. For bulletin with prices write Jones & Hunt, Inc, Adelaide Rd, Gloucester, Mass.

•

Durafluff

A new cationic fabric softener, Durafluff, is available from Manufacturer's Chemical Co, Philadelphia, Pa. The new material reportedly gives fabrics a soft, silky hand with good drape together with increased abrasion resistance (up to 75% more than untreated fabric). It also is said to improve sewability, reduce needle cutting, and increase tear strength.

It can be applied in dye becks, paddle dryers, or washers. Three to four percent on the weight of the goods is the usual amount used. Standard equipment is used for extraction and drying.

For additional information and prices, write to Manufacturer's Chemical Co, Inc, 930 N Darien St, Philadelphia 23, Pa.

Flame Retardant No. 100

A new, low-cost, inorganic, renewable flame retardant for treating all natural and synthetic fibers except acetate is available from Manufacturer's Chemical Co, Inc, 930 N Darien St, Philadelphia 23, Pa. Flame Retardant No. 100 is said to be particularly good for treating high pile and velour fabrics which enclose a large volume of air and burn readily.

The new product is applied by padding the goods with a dilute (8-10 Bé) water solution, squeezing to about 100% wet pickup, and drying in a dryer at 220-250° F or over hot cans. Flame Retardant No. 100 is said to be quite resistant to drycleaning, but is not washfast.

•

Fanta Soft

"Greater softness and pliability than ever before known can be given to tricot," according to a recent announcement by Fancourt Co, 516 S Delaware Ave, Philadelphia, in introducing its new finish, which will be marketed as Fanta Soft. The new finish is said to be highly resistant to yellowing and to remain odorless regardless of the age of the fabric. It reportedly does not effect shade or lightfastness of dyed fibers, imparts a greater antistatic quality to tricot, and offers the preferred matte finish.

According to the W F Fancourt Co, you can't tell the difference when tricot finished with its Fanta Soft is compared with the soft, velvety texture of a kitten's fur.

Fanta Soft is a combination of a resin binder, micro pigments and a softening agent. It reportedly can be applied on a pad by first dispersing it readily in about twice its volume of water at 95°-100°F, and stirring this into a sufficient amount of water to make a 4-8% solution.

Calco Leveling Salt LV

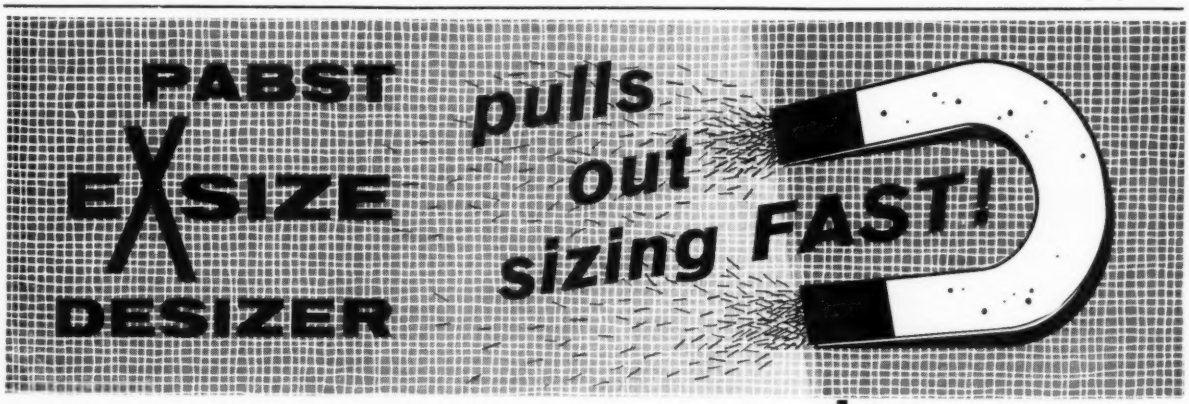
Deeper, level and solidly dyed shades on wool and/or nylon stocks, yarns or fabrics can now be obtained economically with neutral dyes, it is claimed, with the aid of a new leveling agent developed by American Cyanamid Co.

Known as Calco Leveling Salt LV, the agent is applied with the dye under processing conditions, pH 4-6, that should be used for neutral dyes. It is claimed that the soft hand of wool is retained and the barré effect encountered in dyeing nylon carpeting is eliminated. According to Cyanamid, this salt is also expected to solve similar problems in dyeing such other forms of nylon as hosiery and sweaters.

Calco Leveling Salt LV, which does not act as a retarding agent, reportedly allows the colorant to dye rather than stain the cloth. As a result, it is claimed that shades may be matched by adding color in process.

Calco Leveling Salt LV serves the dual purpose of wetting out the fiber and controlling the dyeing. Its use reportedly does not have any adverse effect on the fastness properties of the dyes used.

Dyes recommended by the company for application with its new leveling agent include it Calcofast neutral and Calcocid milling dyes.



Pabst Exsize takes the starch out of cotton fabrics in a hurry! That's because its built-in heat stability makes Exsize work especially well in high-speed desizing ranges. It's uniform too. Every lot is carefully controlled for uniform enzyme activity and always gives you the same safe, speedy action. Order Exsize soon for the best finishing you've ever had.

SAFE · SURE · DEPENDABLE

Write for free Desizing Manual

PABST BREWING COMPANY
Industrial Products Division
MERCHANDISE MART · CHICAGO 54, ILLINOIS

SUPER-POWER DIELECTRIC DRYER

(Special to American Dyestuff Reporter)

ONE of the real problems in the production of textile-grade rayon has been to find a method by which rayon fiber could be dried with greater uniformity and in less time.

Rayon has been dried in ovens sometimes 150 feet in length and two feet or more in width. The quality requirements have warranted expensive designs of conventional drying ovens. Rayon cakes are placed in these ovens for a minimum of approximately 40 and often for 130 hours or more to effect proper drying—the longer the drying time, the better the quality of the fiber.

Many companies explored periodically the use of high-frequency current to effect a faster drying time, and to secure a higher quality, particularly with respect to a uniformly low shrinkage factor. (Irregular shrinkage frequently causes a streaky discoloration in dyed fabric.) Previous attempts to attain this objective reportedly have not resulted in the design of equipment capable of effecting the desired quality under production conditions.

Since the inception of dielectric heating, it has been presumed that there were great possibilities for this method of heating in the removal of moisture from many different products. Conventional methods involving contact between the product and heated surfaces, or movement of large volumes of unsaturated heated air are said to be cumbersome, inefficient, slow and difficult to control. It is claimed that none of these restrictions apply when heat is generated within the product by the flow of a radio-frequency current in the product itself. Moreover, since water is the principal conducting element in most products, control becomes infinitely simpler because the elimination of water automatically limits the generation of heat.

The Thermatool super-power dielectric heater (patent applied for) reportedly represents a major advance in efficient utilization of electric power in the evaporation of moisture. It is claimed that, since less electricity is required, due to a higher conversion efficiency, there is not only a reduction in the cost of the components of the high-frequency equipment itself, but there is a further economy resulting from a reduction in the size of the electrical distribution system. The elimination of ventilating systems, made possible by the condensation of the evaporated moisture within the equipment is said to reduce the cost of building construction and release much building space used by the ventilating facilities for other purposes.

Comparative costs can be predicted if data are available on existing or competitive drying methods. The high-frequency unit normally operates at high efficiency, ie, each pound of water evaporated requires that about one-half kilowatt hour of electricity be supplied to the equipment. Most of the energy lost in conversion and transmitted to the product is eventually absorbed by the cooling water. Whenever there is a need for hot water, a fuel credit can be achieved by use of the hot water discharged from the high-frequency apparatus. In a typical case, the cost of electricity was considered at $0.01 per kilowatt hour and low pressure steam at $0.65 per 1000 pounds. Under these conditions the energy charge for dielectrically evaporating one pound of water is $.006 and a credit of $.0005 could be secured by recovering heat from the hot water.

The distribution of energy-generating cost varies widely between various plants. For this reason, each potential user of super-power dielectric heaters must determine whether he can reduce the cost of his energy consumption by substituting this method of eliminating water from his product. In conventional drying operations, it is customary to use air as a means of removing the moisture from the product and then discharging it from the building. This inevitably means the introduction into the building of large quantities of air, heating this air in winter to building temperature, then heating it further to increase its drying capacity and, finally, discharging it as a moisture-laden stream of hot air. It reportedly can be proven that, in many processes, the heat required to warm the air is in excess of that required to evaporate the water from the product. Studies have indicated that the energy charge for operation of a super-power dielectric heater may vary slightly more or less than conventional drying methods.

It has been suggested that many cost analyses will indicate to management that super-power dielectric heating methods involve a lesser expenditure for energy than do current methods. In some cases, however, there will be inconsistencies in the results of these analyses because of differences in cost-accounting systems. In other cases, there will be no question, for it will be clearly obvious that high-frequency heating involves greater energy charges than do conventional methods. In these cases, however, other advantages of the super-power dielectric heater should be given consideration. Although energy charges are frequently brought to management's attention, the cost of raw materials and of rejected finished products may constitute a much greater portion of manufacturing costs than energy charges. It is suggested by the manufacturer that a small increase in energy charge is a very small price to pay for an improved product, for improved control, reduced inventory and better service to the customer.

With few exceptions, it is claimed that moisture can be removed from nonmetallic materials by high-frequency heating in an interval varying from seconds to minutes. This compares with drying cycles varying hours to days with conventional methods. It is stated that, since the amount of product in process at any given moment is proportional to the drying time, the cost and maintenance of the material-handling facilities are often smaller as compared with the costs of these same facilities when using conventional methods. A reported major advantage of high-frequency drying methods lies in the fact that control of prior processes becomes much more flexible. In many cases variations in prior processing operations are not detectable until after the completion of the drying operation. Detection within minutes, instead of days, can mean a sizable saving in rejected material.

The substitution of condensation for air scavenging of water vapor was introduced on the Thermatool super-power dielectric heater for purposes of simplification of construction and recovery of heated water. Other advantages are cited for this new processing equipment. Many organic and nonmetallic materials are degraded by exposure to atmospheric gases. The Thermatool process reportedly provides the product with an atmosphere composed almost exclusively of inert water vapor (steam). The velocity of the escaping steam is said to encompass the product completely. Not only is atmospheric oxygen partly excluded, but there is no further need to provide elaborate filtering

and precipitating facilities to remove contaminating elements from the atmosphere.

In conventional drying, in order to evaporate the water in the product, it is generally necessary that the air used as a drying medium be at a higher temperature than the boiling point of water in the material. This is true, because heat must be transferred to the moist material in order to effect evaporation. This means that, during the final stages of drying, the material being processed attains temperatures above the boiling point of water. As these temperatures persist for many hours, considerable deterioration of delicate organic products may take place.

In contrast to this, it is reported that, in high-frequency drying the temperature of the material never need be higher than the boiling point of the water contained in it. This is true, because the heat is generated within the very moisture itself. It is not conducted in from the outside.

It is a common belief that high frequency heats a product uniformly throughout all its parts. Although in many cases, the products are uniformly heated, there have been many more cases in which the product was non-uniform and frequently damaged because the mechanical elements of the equipment were not designed with the object of securing complete uniformity throughout the product. The Thermatool method is said to be the result of extensive research in the solution of this particular phase of the process.

In evaluating the achievements accomplished by the Thermatool dryer, the many and varied problems of removing water from synthetic fibers should be considered.

A uniform rate of moisture removal is essential for maximum quality. In standard drying procedures, the inner portions of the cakes do not lose moisture at the same rate as outer portions and moreover this rate can not be averaged for the entire drying period.

Up to recently, there has been a definite lack of knowledge of the fundamentals of high-frequency electric heating in connection with water-laden rayon. Experimentation indicated that excessive temperatures cause rapid deterioration of the products.

Another difficulty was the fact that, although it is simple to construct a unit to process a ton of rayon per day, many complications occur when the minimum objective is five tons.

New Rochelle Thermatool Corp, New Rochelle, NY, is marketing a dryer which, it is claimed, meets the most stringent requirements of all producers of filament rayon by the pot-spinning method. This dryer is a high-frequency electronic device, reportedly capable of delivering dried rayon in which the shrinkage factor is negligible. It was actively tested over a twelve-month period before the first industrial installation was made, and the following features are claimed by the manufacturer:

A) Reduction of the elapsed time between the loading of wet cakes and the delivery of dry cakes to as low as seven minutes.

B) Elimination of shrinkage strains common to other drying systems, thereby permitting a major upgrading of the yarn quality, including uniform dyeing throughout, without striation.

C) Elimination of capillary migration of salts, lubricants or other treating agents. This is said to arise from the fact that evaporation occurs uniformly throughout the cake and is almost complete in less than two minutes. Uniformity of the quality of the fiber within each individual cake is thereby further improved.

D) Reduction of the exposure of the filament to drying temperatures and creation of conditions in which atmospheric gases are partly excluded by water vapor, thereby developing maximum strength, improved color and cleaner yarns.

E) Ability to adjust to dry any size cakes with equal facility. The unit rating is primarily based on the weight of the water removed, *not* on the number of cakes or weight of the dried product.

F) Operation by one unskilled operator, who can perform all leading operations on a unit having a *nominal* total capacity of five tons of dried rayon in an eight-hour day.

G) Elimination of cake handling racks between the pot extractor and the coning room.

H) Reduction of electrical power consumption to about five hundred watt-hours for each pound of water evaporated.

I) Condensation of the water evaporated from the cakes within the dryer and return of the heated cooling water to the hot-water system. Among the cited advantages of this feature (patent applied for) are:

1) Most ventilating problems are eliminated. It is not necessary to introduce, wash, heat, clean and discharge large quantities of air.
2) The working environment in the vicinity of the dryer may be as pleasant as any other plant locality.
3) Almost all of the heat in the electrical energy furnished to the unit is recaptured in the form of usable hot water. This water may be added to the cake washer feed, thereby measurably reducing the quantity of steam required in this operation. This, in effect, constitutes a credit against the cost of electricity.

J) Corrosion proof. Resistant aluminum alloys and organic coatings are used throughout. The acid gases normally present in rayon plants will not attack the dryer components.

K) Automatic, complete protection is provided against all normal and abnormal operating conditions by an electronic "crowbar", which protects the equipment and product in case a high voltage arc is created by abnormal conditions. The current is cut off in millionths of a a second with no damage to the product.

L) The simplicity of the high-frequency circuit, which is basically a resonant cavity, radically reduces maintenance requirements.

M) The unit is fifteen feet long and seven feet, six inches wide, and eleven feet, six inches in height. The floor space requirements for such a unit offer distinct advantages as compared with currently used ovens.

N) In addition to the quality drying which can be accomplished in seven minutes, the advantages of such speed in terms of reduced inventory and improved quality are readily apparent.

New Rochelle Thermatool Corp studied the rayon industry and instituted research into the failures that had resulted from attempts to harness high-frequency electric current to a device that would dry rayon fiber, and after two years they had their first working model of a dryer that was designed to be simple, desirable, and easy to maintain.

The problem of successfully drying rayon fiber by high-frequency methods, the desire for minimum drying time and the elimination of regain treatment were major considerations. Still another consideration was the designing and building of a dryer that would eliminate dust, dirt and atmospheric gases and thereby preclude possible arc damage. New Rochelle Thermatool Corp states that it now has a time-tested machine that completely answers the problem in that it dries the cakes in a few min-

utes, with little shrinkage and definite uniformity of fiber. This machine reportedly has proven past performance in actual production for a twelve-month period.

The Thermatool unit, with patent-applied-for features, is a combined high-frequency oscillator, cake conveyor and heat-recovery system.

The electrically insulated electrodes are located in a heated and insulated doughnut-shaped oven. The grounded electrodes are on the inside of the outer panels. This enclosure is heated by steam to a temperature above 212°F to prevent condensation of water vapor. The cakes rotate as they pass between the specially designed electrodes.

The losses in the oscillator tube constitute about two-thirds of the entire loss in the conversion of low-frequency power into heat in the product. Part of these losses are absorbed by the high-pressure air blast from the centrifugal compressor. The losses to the air stream are said to be minor compared with those dissipated in the water-cooled anode. This heat is absorbed by recirculated distilled water, which is in turn cooled in a heat exchanger by the plant cooling water. After passing through the heat exchanger, the plant water passes through the condensing coils in the oven. The oscillator is designed for easy access. All panels are removable and tube and components can be visually observed during operation.

A cubicle contains the high-voltage rectifier and certain other components essential to the operation of the high-power oscillator. The direct current high voltage output is transmitted to the bottom of the oscillator by an underground (or floor) insulated conductor. It receives high-voltage, three-phase alternating current power from the plate transformer.

The control cubicle contains all the facilities for starting, stopping and protecting the oscillator and load. The very high concentration of power in this equipment necessitated the use of interlocking protective devices which would protect the product and components under all circumstances.

The fault current limiting features are worthy of special note. The probability of damaging arcs increases with both frequency and power. This is particularly true at frequencies in the megacycle range. At these frequencies an arc can exist as a discharge into the surrounding air or space. Damage from such arcs is said to be completely suppressed by the Thermatool monitor. This device detects an arc and interrupts the flow of power in a few millionths of a second.

The design and construction of the Thermatool High-Frequency Rayon Dryer was carefully conceived to accomplish several important objectives. Its continuous use over a period of time reportedly has demonstrated the following.

A) Achieved an output of over 11,000 BTU per minute at a power concentration of over 100 BTU per minute per pound (average weight) when drying rayon filament in cake form.

B) Reduced the size of the equipment by reducing the volume of the material being processed at any given moment.

C) Reduced the interval during which the product is exposed to elevated temperatures, thereby decreasing thermal degradation to a negligible magnitude.

D) Facilitated removal of the conveying machinery from the electric field, thereby eliminating rapid wear and heating of this component.

E) Facilitated the collection of water vapor, its condensation and its removal as a fluid.

F) Permitted reducing the number of cakes being dried at any given instant to fifty. In the Thermatool construction, these cakes are arranged in a single circle and all cakes receive exactly the same treatment.

G) Facilitated compact construction, easy to ship and free from high-frequency radiation problems.

After the initial warm-up period, the operator starts and stops the unit by push button on the conveyor. The moisture content of the cakes is controlled by the conveyor speed. Transient conditions which actuate the fault monitor do not require the operator's attention. After a very brief interruption, the unit restarts automatically. Normal variations in cake weight result in fluctuation of the energy input so as to maintain a constant moisture content.

The Thermatool super power dielectric heater is basically a package-handling unit. It can reportedly be adapted to a variety of packages, which are to be handled in sequence. The same principles which are incorporated in this unit can be used in the design of facilities to handle blocks of material such as package yarn or continuously moving webs of varying thicknesses. These basic developments and principles may result in the same general economies and control of quality in other drying applications, although the most obvious market is the elimination of water from fibrous and porous substances. Other uses may occur to the reader.

SPECIAL NOTICE

In order to speed up production schedules to meet revised deadlines, it is necessary to move up the closing date for all issues of AMERICAN DYESTUFF REPORTER to three weeks before publication date, for news copy.